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NATIONAL DAM SAFETY PROGRAM. CONEWANGO CREEK WATERSHED DAM NUMB--ETC(U)
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Conewango Creek Watershed Site 9A Dam
Chautauqua County
Allegheny River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life and property. However, the dam has some deficiencies which require further investigation and remedial action.

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The hydrologic/hydraulic analysis performed indicates that the spillway does not have sufficient capacity to discharge the peak outflow from the Probable Maximum Flood (PMF). However, spillway discharges occurring during large storm events will cause water surface elevations in the downstream hazard area to rise to flood levels. A dam failure resulting from overtopping would not significantly increase the hazard to loss of life from that which would exist just prior to an overtopping failure. The spillway has sufficient capacity to discharge 79% of the PMF. Therefore, the spillway is assessed as inadequate.

The dam is located in Seismic Zone 3 and there is no record of a seismic stability analysis being performed. Therefore, additional investigations by a qualified registered progressional engineer to evaluate the seismic stability of the dam are recommended.

The investigations should be completed within 12 months of notification to owner, and to remedial actions resulting from these investigations completed in the subsequent 12 months.

The following remedial measures should be performed within one year from notification:

- Regrade and fill in the tire ruts on the downstream slope. Reseed the disturbed areas.
- Regrade and fill in the area of wave erosion on the upstream slope. Monitor for signs of future erosion.
- Implement a program of diligent and periodic maintenance including but not limited to: operation and lubrication of the reservoir drain; mowing of slopes and spillway channels; backfilling ruts, drainage gullies and animal burrows with suitable compacted material; clearing debris from trash racks and from upstream slopes.
- Install ladder rungs on the riser to provide access to the drain gate housing.
- Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.
- Develop and maintain a program of biannual technical inspections.

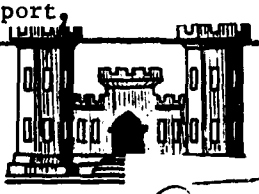
ALLEGHENY RIVER BASIN

CONEWANGO CREEK WATERSHED
DAM No. 9A

CHAUTAUQUA COUNTY, NEW YORK
INVENTORY No. N.Y. 596

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

(6) Conewango Creek Watershed Dam Number 9A (Inventory Number NY.596), Allegheny River Basin, Chautauqua County, New York. Phase I Inspection Report.



(15) DACW51-81-C-0017

(11) Aug 81

(10) Robert J. Farrell

(12)

NEW YORK DISTRICT, CORPS OF ENGINEERS

AUGUST 1981

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PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D.C. 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigation and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the Investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I Inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test Flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event a finding that a spillway will not pass the Test Flood should not be interpreted as necessarily posing a highly inadequate condition. The Test Flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

Name of Dam:	Conewango Creek Watershed Dam No. 9A
State Located:	New York
County Located:	Chautauqua
Stream:	Conewango Creek
Basin:	Allegheny River
Date of Inspection:	May 22, 1981

ASSESSMENT

Examination of available documents and a visual inspection of the dam did not reveal conditions which constitute an immediate hazard to human life and property. However, the dam has some deficiencies which require further investigation and remedial action.

The hydrologic/hydraulic analysis performed indicates that the spillway does not have sufficient capacity to discharge the peak outflow from the Probable Maximum Flood (PMF). However, spillway discharges occurring during large storm events will cause water surface elevations in the downstream hazard area to rise to flood levels. A dam failure resulting from overtopping would not significantly increase the hazard to loss of life from that which would exist just prior to an overtopping failure. The spillway has sufficient capacity to discharge 79% of the PMF. Therefore, the spillway is assessed as inadequate.

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- Regrade and fill in the tire ruts on the downstream slope. Reseed the disturbed areas.
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- Implement a program of diligent and periodic maintenance including but not limited to: operation and lubrication of the reservoir drain; mowing of slopes and spillway channels; backfilling ruts, drainage gullies and animal burrows with suitable compacted material; clearing debris from trash racks and from upstream slopes.

- Install ladder rungs on the riser to provide access to the drain gate housing.

- Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

- Develop and maintain a program of biannual technical inspections.

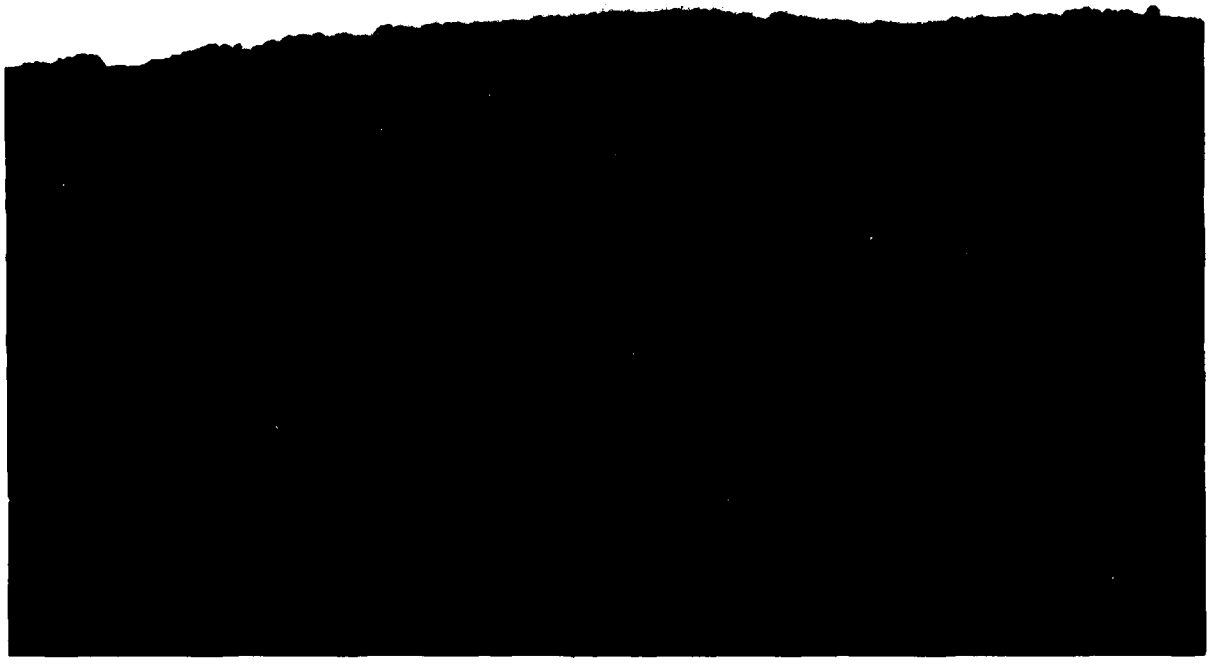
Robert J. Farrell, P.E.
New York No. 55983

Approved by:

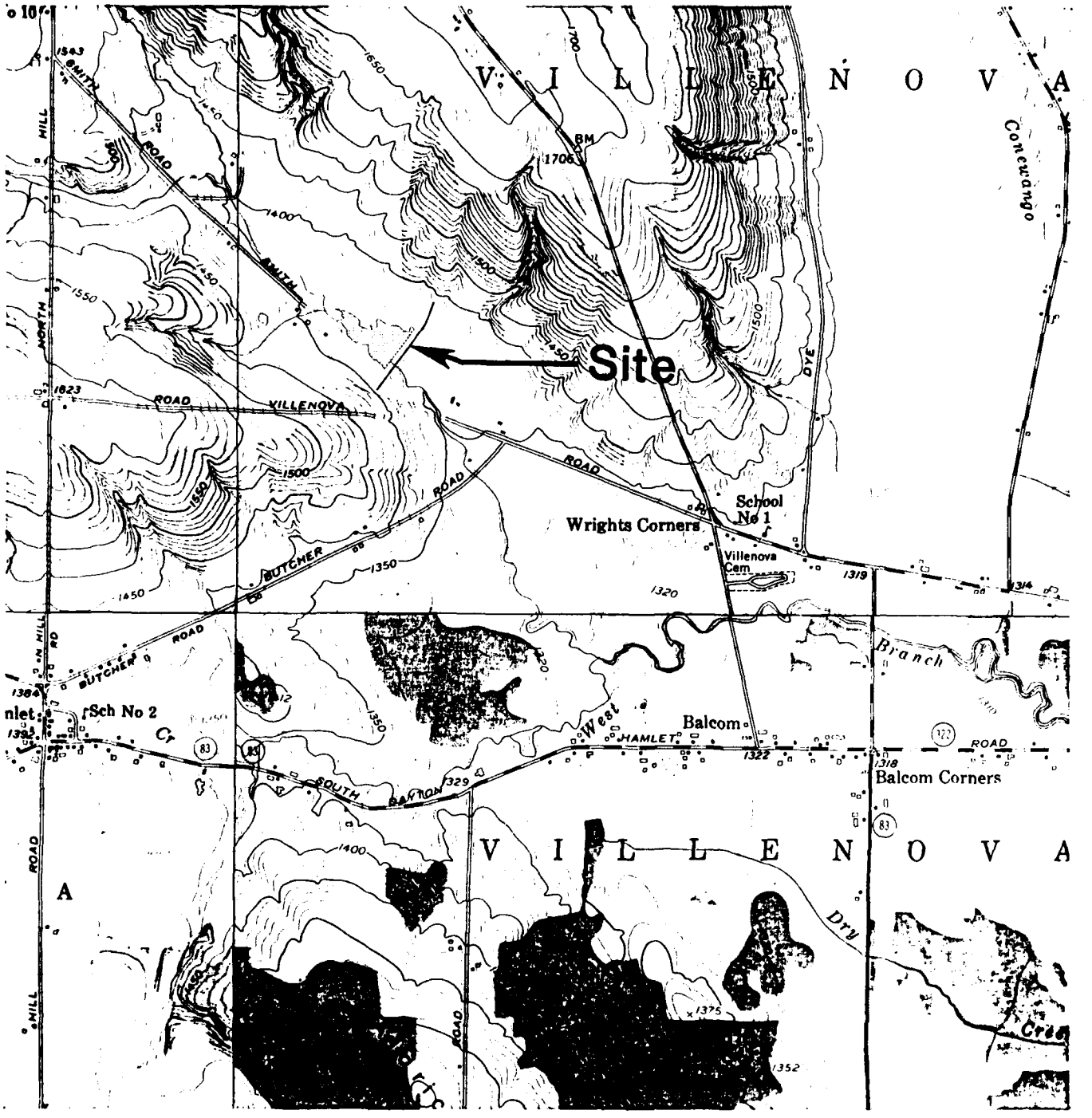
Col. W.M. Smith, Jr.
New York District Engineer

Date: 27 Aug 81

Conewango Creek Watershed
(Site 9A)



OVERVIEW



Conewango Creek Watershed
(Site 9A)

LOCATION PLAN

Scale: 1" = 2000'

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
CONEWANGO CREEK WATERSHED DAM NO. 9A

SECTION I - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the New York District Corps of Engineers in a letter dated 24 February 1981, in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, dated 8 August 1972.

b. Purpose of Inspection

This inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF THE PROJECT

a. Description of Dam and Appurtenances

The Conewango Creek Watershed Dam No. 9A is an earth embankment approximately 1590 ft. long, with a maximum height of about 43 ft. and a crest width of 16 ft. The grassed downstream slope is 1V:2½H. The upstream slope is 1V:3H and grassed from the bottom to the top.

According to available contract drawings, the embankment consists of semi-pervious silty sand and gravel core with coarse gravel shells. There is a berm on the upstream slope approximately 10 ft. wide. The berm extends the full length of the dam at elevation 1365.5 MSL. Beneath the embankment is an earthfill cutoff trench which is 12 ft. wide at the bottom. According to available plans, it is constructed of the same silty sand and dense gravel material as the embankment.

The principal spillway consists of a reinforced concrete drop inlet structure with a sluice gate controlled inlet pipe, two uncontrolled orifice inlets and a 48 in. outlet pipe supported on a concrete cradle.

The inside dimensions of the riser structure are 30 ft. high and 12 ft. wide normal to the axis of the dam. It is 4 ft. long parallel to the embankment and flares to 21.67 ft. long at the top . The walls of the structure are 18 in. thick for the bottom 4.5 ft., 15 in. thick for the next 10 ft., 12 in. thick for the next 5 ft., and 10 in. thick for the top section. The top slab is 8 in. thick. The structure is founded on a 9 ft. by 15 ft. spread footing.

The "low stage inlet" is an uncontrolled opening approximately 15.6 ft. above the sluice gate invert. It is 3 ft wide and 2.2 ft. high and is located in the upstream face of the riser structure. The water flows through this orifice and drops into the riser structure. It is protected by a trash rack assembly approximately 11 ft. high and 5.5 ft. wide. This assembly is fabricated from galvanized steel angle sections.

The "high stage inlet" consists of two openings approximately 30 ft. above the sluice gate invert. They are 12 ft. wide and 2 ft. high and are located in the left and right sides of the flared portion of the riser structure. They are protected by a galvanized steel grating 33.4 in. high placed in front of each high stage opening and 5 galvanized steel angles placed in the sloping section below each opening. A 3 ft. diameter manhole permits access into the riser structure.

The riser structure is drained by a 48 in. diameter reinforced concrete pressure pipe. It is approximately 178 ft. long and drops approximately 2 ft. over that length. The pipe penetrates the downstream side of the riser structure and is supported by a 6 in. thick concrete cradle within the embankment. Plans indicate 7 concrete anti-seep collars cast around the pipe within the embankment.

The downstream end of the pipe penetrates the reinforced concrete impact basin. The inside dimensions of the impact basin are 23.3 ft. wide normal to the axis of the dam and 17.5 ft. long parallel to the embankment. It is 12.3 ft. high at the upstream face and tapers to 7.3 ft. at the downstream end. At the downstream side there is a cutoff wall extending 3.0 ft. beneath the floor of the impact basin and there are two wingwalls extending 10.5 ft. beyond the sidewalls of the basin parallel to the embankment. There is a 1 ft. thick by 7.5 ft. high baffle spanning between the walls of the impact basin. A 24 in. thick rip-rap apron extends 16 ft. downstream from the end of the impact basin.

An excavated emergency spillway channel is located at the north abutment. The channel is approximately 200 ft. wide at the base, 5.2 ft. high, and has 1V:3H side slopes. The control section is 200 ft. wide and 50 ft. long and the downstream channel is roughly 400 ft. long. A 50 ft. wide excavated bench is located north of the emergency spillway at elevation 1396 MSL. The bench intersects existing ground at 1V:3H side slope.

A 48 ft. long reinforced concrete pressure pipe located on the upstream side of the principal spillway sewer acts as the reservoir drain. The pipe rests on a 6 in. thick unreinforced concrete cradle. The upstream invert is at elevation 1354.5 MSL, and the pipe enters the principal spillway at elevation 1353.8 MSL, 2.8 ft. above the riser floor. The drain is regulated inside the structure by an 18 in. diameter slide gate, and a stem, and stem guides which rise to the top of the top slab where the handle housing is located.

A vertical seepage drain is located beneath the downstream slope to provide a safe outlet for seepage. It is 4 ft. wide and of variable depth. From approximately 160 ft. right of the principal spillway outlet to approximately 800 ft. left of the outlet, the drain contains a system of two, 8 in. diameter, perforated asbestos cement pipes which outlet on either side of the impact basin outlet structure.

b. Location

The dam is located approximately 4 miles northwest of South Dayton, New York in the Town of Villanova.

c. Size Classification

The dam is 43 ft. high and the reservoir has a storage capacity of 964 acre-ft. at elevation 1391.8 (top of dam). The dam is classified as "INTERMEDIATE" in size (40 to 100 ft. in height).

d. Hazard Classification

The dam is classifed as HIGH hazard due to the significant economic and high potential for loss of life downstream in the event of dam failure. Table 5-1 shows the locations of downstream dwellings.

e. Ownership

The dam is owned and operated by:

Conewango Creek Watershed Commission
Donald Crowell, Chairman
RD #2
S. Dayton, New York 14138
Tele: (716) 988-3300

f. Purpose of Dam

The purpose of this dam is to reduce downstream flooding by providing temporary storage for the runoff from 3,840 acres. The temporary storage is released gradually through the two-stage principal spillway system.

g. Design and Construction History

The dam was designed by the U.S. Department of Agriculture Soil Conservation Service. For this inspection, a set of "as-built" contract drawings was provided by the Soil Conservation Service in Syracuse, New York. "As-built" dam cross sections, geotechnical design and analysis data, and supervision of construction reports can be found at the U.S. Department of Agriculture - Soil Conservation Service, Design Section, Syracuse, New York. The dam was constructed in 1972. The contractor's name is unknown.

h. Normal Operating Procedure

Water release from the lake is through the 48 in. reinforced concrete outlet pipe.

1.3 PERTINENT DATA

a. Drainage Area - 6.0 square miles

b. Discharge at Damsite

Maximum known flood at damsite - Unknown	
Discharge from observed recent high water mark	114 cfs
Emergency Spillway	
Maximum Pool (top of dam)	7708 cfs
Principal Spillway	
Maximum Pool (top of dam)	492 cfs
Total Spillway Capacity at Maximum Pool Elevation	8200 cfs

c. Elevation (U.S.G.S. Datum)

Top of dam	1391.8 ft.
Normal Pool	1366.6 ft.
Principal Spillway	
Upstream invert	1351 ft.
Downstream invert	1349 ft.
Riser Crest	1381 ft.
Emergency Spillway Crest	1386.6 ft.

d. Reservoir

Length of Normal Pool	1200 ft.
Length of Maximum Pool	3400 ft.

e. Storage

Normal Pool	41 acre-ft.
Maximum Pool	964 acre-ft.

f. Reservoir Surface

Normal Pool	8.8 acres
Maximum Pool	74.6 acres

g. Dam

Type	Earth
Length	1590 ± ft.
Maximum Height	43 ± ft.
Top Width	16 ft.
Side Slopes (V:H)	
Upstream	1:3
Downstream	1:2.5

h. Reservoir Drain

Type	Reinforced concrete pipe
Diameter	18 in.
Closure	Vertical slide gate

i. Principal Spillway

Type	Reinforced concrete pipe
Diameter	48 in.
Location	Near center of reservoir
Support	Concrete cradle
Upstream	Rectangular concrete drop inlet structure
Downstream	Reinforced concrete impact basin

j. Emergency Spillway

Type	Excavated channel
Base Width	200 ft.
Height	5.2 ft.
Side Slopes	1V:3H
Location	North abutment

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

Local bedrock consists of interbedded shales, siltstones, and sandstones of late Devonian Age (345-375 million years ago). These relatively underformed flat-lying sedimentary rocks are medium hard. Regionally, the bedrock forms a homocline dipping southward to southwestward at approximately 40 feet per mile. Small terraces and low folds locally modify this dip to essentially horizontal over short distances. Only minor folding and faulting are found in the region with no major or active faults known to exist in the area.

The Conewango Creek Dam 9A is situated in a region classified as Zone 3 seismicity as shown on Figure No. 1 of the Recommended Guidelines for Safety Inspection of Dams.

Pleistocene glaciation (beginning approximately 2 million years ago) has modified the topography by means of erosion and deposition. The thick continental ice sheet advanced and receded repeatedly in the area smoothing terrain by glacial scour and mantling uplands with till deposits.

The Pleistocene geology of the immediate dam site consists of glacial ground moraine deposits. Generally, the overburden consists of sandy gravel alluvial deposits overlying lacustrine clays and silts. Alluvial gravels and sands underlie the lacustrine materials and dense glacial tills underlay the alluvial materials. In recent times alluvium, eroded from nearby uplands, has been deposited upon the glacial deposits.

2.2 SUBSURFACE INVESTIGATION

Test hole logs are contained in the "as-built" drawings. A total of 28 test pits and 34 drill holes were dug to determine subsurface conditions. The logs show that the dam is founded on glacial till at the north abutment and on silty sand and gravels in the center and south abutments.

2.3 DESIGN RECORDS

The records available for the project consists of 34 contract drawings which show the plans, sections and details of the dam, appurtenant structures, impact basin details and grating, fencing details, and logs of test holes; and a design report issued by the U.S. Soil Conservation Service dated May 10, 1972.

2.4 CONSTRUCTION RECORDS

Construction records and specifications are available at the U.S. Soil Conservation Service, Design Section, Syracuse, N.Y.

The sedimentation basin structure shown on Page 2 of the "As-built" drawings was not found during the visual inspection.

2.5 OPERATION RECORDS

No written maintenance or operation records exist for the dam

2.6 EVALUATION OF DATA

Information obtained from the "As built" drawings is consistent with observations made during this inspection with the exception of the sedimentation basin discussed in Section 2.4. The information obtained from available data was considered adequate for the Phase I inspection and evaluation.

SECTION 3 - VISUAL INSPECTION

3.1 FINDINGS

a. General

A visual inspection of Conewango Creek Watershed Dam No. 9A was made on 2 May 1981. The weather was clear and the temperature in the mid-seventies. At the time of the inspection, the reservoir level was about 2 in. above the intake structure crest elevation.

b. Dam

The earth embankment appears to be in good condition.

There is a light brush growth at the waterline on the upstream slope. The grass cover on this dam is generally in good condition. There has been some vehicular traffic on the downstream slope resulting in ruts approximately 2 to 4 in. deep, running vertically up the slope approximately 75 ft. to the right of the outlet structure. The crest ofthe dam is in good condition with no evidence of vertical or horizontal movement.

Animal burrows up to 6 in. in diameter were noted in the downstream slope approximately 150 ft. to the left of the right abutment, approximately 300 ft. to the left of the outlet structure, and at the contact with the emergency spillway diversion berm. An animal burrow approximately 8 in. in diameter was noted at the right upstream end of the diversion berm.

There is no slope protection on the upstream slope other than the vegetative cover and a 10 ft. berm just below waterline. Approximately 4 to 6 in. of erosion due to wave action was noted at and just above the waterline. Small (1-2 in diameter) eddy current type, erosion gullies were noted over most of the surface of the embankment. A few minor (3 in. deep) erosion channels were noted approximately 400 ft. north of the outlet structure on the downstream slope. A mat of dead grass caused by infrequent mowing is believed to be responsible for this concentration of runoff.

Some debris in the form of trash, vegetation, and driftwood, etc., has collected along the upstream slope at approximately the level of the high stage inlet.

Two toe drain outlets are located in the wingwalls of the impact basin. No discharge was noted from these outlets.

c. Principal Spillway

The principal spillway appears to be in good condition . No debris was noted on the low or high stage trash racks or on riser structure. There is a minimum amount of erosion around the inlet and outlet works. There is no access to the riser structure. No seepage was found around the spillway pipe. The channel for 16 ft. downstream of the impact basin is protected by rip-rap which appears durable and is generally in good condition.

d. Emergency Spillway

The emergency spillway appears to be in good condition. Grass, 6 in. high, covers the crest and downstream channel spillway. No debris was noted on the crest. An area of ponded runoff or natural groundwater was noted downstream of the control section of the channel. It encompasses the surface of the berm on the north slope. A small spring was noted on the north slope above the berm.

The water is drained from the berm through a 4 in. cast iron pipe located approximately at station 8+00, 100 ft. left on the emergency spillway.

There is a small tributary which joins the outlet channel approximately 250 ft. downstream of the principal spillway outlet. The tributary flows normal to the direction of outflow channel from dam.

e. Appurtenant Structures

The sedimentation basin structure shown on Page 2 of "As built" drawing was not found but there exists an embankment with no definite slope.

The stem of the slide gate does not have a handle attached to it. The operability of the gate could not, therefore, be determined. The reservoir drain inlet was located below the water surface at the time of inspection.

f. Downstream Channel

The downstream channel is a narrow channel passing over relatively flat flood plain. Minor erosion of the right bank has taken place at a point 200 ft. downstream of the outlet. The channel bottom is gravel.

g. Reservoir

The shore of the reservoir is generally shallow sloping pasture and farmland. It appears to be stable and in good condition. There is no visible sign of sedimentation problems in the reservoir area.

h. Abutments

No seepage was observed at either the south or north abutments. The south abutment is covered by farm lands and the north abutment is cut into a hill covered by woods. There exists an unpaved road at the south abutment that runs along the top of the dam.

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the inspection did not indicate any serious problems which would adversely affect the adequacy of the dam and appurtenant facilities.

The potential problems noted during the visual inspection are listed below:

1. Animal burrows in embankment slopes.
2. Brush growth and wave erosion at the waterline on the upstream slope.
3. Rutting of downstream slope due to vehicular traffic.
4. Grass needs regular mowing.
5. The operation of the reservoir drain could not be checked because there is no access to the top of the riser and no gate handle on the stem.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

No written operation and maintenance procedures exist for the project. The normal operation of the project consists of allowing water to flow through the service spillway outlet pipe.

4.2 MAINTENANCE OF DAM

An annual inspection of the dam is made by the Soil Conservation Service. Recommendations resulting from this inspection are implemented by the Soil Conservation Service.

4.3 WARNING SYSTEM IN EFFECT

No warning system is in effect or in preparation.

4.4 EVALUATION

The overall condition of the dam and appurtenant structures appears to be good. Recommendations in connection with regular maintenance are discussed in Section 7.

SECTION 5 - HYDRAULIC/HYDROLOGIC

5.1 DRAINAGE AREA CHARACTERISTICS

Conewango Creek Watershed Dam No. 9A is located on a tributary of Conewango Creek in the Allegheny River basin, and has a drainage area of 6.0 square miles. The dam is situated approximately 4 miles northwest of South Dayton, New York in the Town of Villenova. The topography of the watershed is hilly woodland, pastures, and farmlands.

5.2 DESIGN DATA

The dam was designed as a Class B structure in accordance with critera established in Washington Engineering Memorandum SCS-27. Under this classification, the emergency spillway is designed for a rainfall equal to P(100) + 0.12 [PMP-P(100)] , while the freeboard pool is designed for P(100) + 0.40 [PMP-P(100)] .

The Soil Conservation Service (SCS) design calculations have been reviewed. The dam was designed to contain the runoff for the 50 year flood without discharging through the emergency spillway. The peak outflow is 312 cfs and the peak elevation is 1386.6 ft. (MSL). The SCS design allowed for a 50 year sediment accumulation with a storage of 40.6 acre-ft. The principal spillway consists of 48 in. diameter reinforced concrete pressure pipe and a 4 ft. x 12 ft. reinforced concrete riser with two 12 ft. x 2 ft. openings with a crest elevation of 1381.0 ft. (MSL). The riser has a 3.0 ft. x 2.17 ft. orifice with a crest elevation of 1366.6 ft. (MSL). The emergency spillway control cross section is 200 ft. wide, with side slopes of 3 horizontal to 1 vertical and a crest elevation of 1386.6 (MSL). The dam crest elevation is 1391.8 (MSL).

5.3 ANALYSIS CRITERIA

The analysis of the spillway capacity of the dam and the storage of the reservoir was performed using the Corps of Engineers HEC-1 Dam Safety Version computer model. The unit hydrograph was defined by the Snyder Synthetic Unit Hydrograph method, and the Modified Puls routing procedure was incorporated. The Probable Maximum Precipitation (PMP) was 22.6 in. (24 hours 200 sq. miles) from Hydrometerological Report #33 in accordance with the Recommended Guidelines of the Corps of Engineers. The dam is 43 ft. high and impounds approximately 964 acre-ft.at the top of the dam. The dam is classified as a HIGH hazard and INTERMEDIATE in size, according to the Recommended Guidelines of the Corps of Engineers. The spillway design flood is the Probable Maximum Flood (PMF). The floods selected for analysis were 20, 40, 50, 60 80 and 100% of the PMF flows. The PMF inflow of 10,448 cfs was routed through the reservoir and the peak outflow was determined to be 10,423 cfs. The peak PMF

5.5 EXPERIENCE DATA

There are no flood records for the dam site. However, during the field investigation evidence of recent high water was observed at elevation 1380.5 ft. (MSL). This reservoir elevation corresponds to a peak outflow of 114 cfs.

5.6 OVERTOPPING POTENTIAL

The maximum capacity of the spillways is 8259 cfs which is less than the PMF peak outflow of 10,423 cfs. The dam is overtopped by the PMF, the peak elevation being 0.4 ft. above the top of the dam. The dam is not overtopped by half the PMF, the peak elevation being 1.5 ft. below the top of the dam. The spillways can pass 79% of the PMF outflow before overtopping occurs.

5.7 ANALYSIS OF DOWNSTREAM IMPACTS

During the field investigation, dwellings and highways located downstream of the dam were identified and referenced to the channel invert. The cross section locations used in the downstream channel routing are shown on PageD-2, Appendix D. The impacts of the PMF on dwellings located downstream of the dam are shown in Table 5.1. For the purposes of this analysis, a danger of loss of life was assumed to exist if the computed PMF water surface was above the first floor elevation of a structure. This situation does not occur at any of the structures and no roads are overtopped during the PMF. In spite of these results, the potential danger of loss of life and economic damage is substantial enough to warrant classification as a HIGH hazard dam.

5.8 EVALUATION

The spillway of Conewango Creek Watershed Dam No. 9A will safely pass the 1/2 PMF without overtopping but it will not pass the PMF without overtopping. The spillway, therefore, is assessed as inadequate, but not seriously inadequate. Potential problems include:

a) The danger of loss of life and economic damage downstream of the dam for the PMF condition.

TABLE 5-1

SUMMARY OF DOWNSTREAM IMPACTS FOR PMF

Location # (See Pg. D-2) Appendix D	Location	# of Dwellings	Structure Height Above Streambed* (ft)	Peak Flow (cfs)	Peak Stage (ft)	Comments
-	At Dam	-	-	10423	-	-
1	670 ft. d/s of Dam	1 1	13.5 12	10430	8.8	No danger of loss of life
2	7600 ft. d/s of Location 1	2	20.	20599	14.1	No danger of loss of life
3	1800 ft. d/s of Location 2	1	26	20605	16.6	No danger of loss of life
4	1500 ft. d/s of Location 3	2	20.	20577	14.6	No danger of loss of life

* The structure height above the streambed is the elevation of the first floor above the channel invert.

NOTE: A tributary stream joins the channel leading from the dam at a point between Locations 1 and 2

SECTION 6 - STRUCTURAL STABILITY

6.1 VISUAL OBSERVATIONS

There does not appear to be significant displacement or distress associated with the embankments at this site. The dam appears to be in good condition at the present time.

6.2 DESIGN AND CONSTRUCTION DATA

Analyses carried out during the design and construction phase by the Soil Conservation Service included a slope stability analysis by a modified Swedish circle method. The parameters assumed were:

Upstream slope: 3H:1V, full drawdown, 10 ft. berm at El. 1365.6 ft, $\phi = 31.5^{\circ}$, c = 100 psf.

Downstream slope: 2:5H:1V, trench drain at c/b = 0.6, no berm, $\phi = 31.5^{\circ}$, c = 100 psf.

The factors of safety calculated were 1.35 for the upstream slope and 1.74 for the downstream slope. The Phase I Recommended Guidelines suggests safety factors of 1.2 and 1.5, respectively, for the conditions analyzed. Based on the existing conditions as revealed by the visual inspection and the review of the original design information, the dam is considered to possess adequate structural stability.

6.3 POST CONSTRUCTION CHANGES

There have been no known changes to any of the embankments or structures at this dam.

6.4 SEISMIC STABILITY

The dam is located in Seismic Zone #3 and, in accordance with recommend Phase I guidelines, a seismic stability analysis is warranted. This should be accomplished by a qualified registered professional engineer and should be made part of the record for this dam.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of the available documents and visual inspections of the Conewango Creek Watershed Dam No. 9A and appurtenant structures did not reveal any conditions which constitute a hazard to human life or property. The dam and its appurtenances are considered to be in good condition at the present time.

Using the Corps of Engineers screening criteria for review of spillway adequacy, it has been determined that the dam would be overtopped for the spillway design flood of the full PMF. The principal and auxiliary spillway capacity are, therefore, judged as inadequate.The dam would not be overtopped for one-half the PMF.

b. Adequacy of information

This report and its conclusions are based on visual inspection, interview data, contract drawings, and office hydrologic/hydraulic studies. This information and data are adequate for a Phase I inspection.

c. Need for additional investigations

It is recommended that the services of a qualified registered professional engineer be retained to evaluate:

1) the seismic stability of the dam.

The engineer should make recommendations for remedial measure if warranted and the owner should implement the findings of these studies.

d. Urgency

All remedial actions described below should be completed within one year of notification to the owner.

7.2 RECOMMENDED MEASURES

It is recommended that the owner institute the following remedial measures:

1) Develop a formal written downstream warning system to alert the appropriate officials and residents in the event of an emergency.

2) Develop and maintain a program of biannual technical inspections.

3) Regrade and fill in the tire ruts on the downstream slope. Reseed the disturbed areas.

4) Regrade and fill the area of wave erosion on the upstream slope. Monitor for signs of future erosion.

5) Install ladder rungs on the riser to provide access to the drain gate housing.

6) Implement a program of diligent and a periodic maintenance including but not limited to: mowing of slopes and spillway channels; back-filling ruts, drainage gullies, and animal burrows with suitable compacted material; clearing debris from trash racks and upstream slopes; and check the operability of and lubricating of the reservoir drain gate.

APPENDIX A

VISUAL INSPECTION CHECKLIST

VISUAL INSPECTION CHECKLIST

1) Basic Data

a. General

Name of Dam Conewango Creek Watershed Dam No. 9A

Fed. I.D. # N.Y. 00596 DEC Dam No. 7B-3979

River Basin Allegheny

Location: Town Villenova County Chautauqua

Stream Name Tributary of Conewango Creek

Tributary of

Latitude (N) 42° 23.0' Longitude (W) 79° 06.9'

Type of Dam Earth Embankment

Hazard Category HIGH

Date(s) of Inspection May 20, 1981

Weather Conditions Sunny, 75°

Reservoir Level at Time of Inspection Approximately elevation 1367

b. Inspection Personnel Jeff Hardin, Ray Kampff, Ken Avery, Bob Farrell

c. Persons Contacted (including Address & Phone No.)

U.S. Soil Conservation Service, RM771-Federal Bldg., So. Clinton St., Syracuse, N.Y.

State Construction Engineer: Philip "Skip" Nelson / 1-315-423-5502

Area 1 Project Engr (Batavia): Pete Wright / 1-716-343-3664

Contracting Office for Ischua Creek Watershed: Ed Smith - Contacted through Pete Wright

d. History:

Date Constructed 1972 Date(s) Reconstructed

Designer U.S.D.A. Soil Conservation Service

Constructed by

Owner Conewango Creek Watershed Commission

2) Embankment

a. Characteristics

(1) Embankment Material Semi-pervious, silty sand and gravel core, coarse gravel shells

(2) Cutoff Type Earth fill, semi-pervious, 12 feet wide, variable depth

(3) Impervious Core Semi-pervious silty sand and gravel (compacted glacial till)

(4) Internal Drainage System 4 foot wide trench drain with 8 inch diameter perforated pipe

(5) Miscellaneous

b. Crest

(1) Vertical Alignment Good

(2) Horizontal Alignment Good

(3) Surface Cracks None noted

(4) Miscellaneous

c. Upstream Slope

(1) Slope (Estimate) (V:H) 1 vertical to 3 horizontal

(2) Undesirable Growth or Debris, Animal Burrows light brush and grass growth, needs mowing

(3) Sloughing, Subsidence or Depressions None noted

(4) Slope Protection Grass, no riprap, 10 foot berm just below waterline, approximately 6 inches of wave erosion at, and just above, waterline

(5) Surface Cracks or Movement at Toe None noted

d. Downstream Slope

(1) Slope (Estimate - V:H) 1 vertical and 2.5 horizontal

(2) Undesirable Growth or Debris, Animal Burrows Animal burrows noted 150 feet left of right abutment, 300 feet left of outlet and at left abutment

(3) Sloughing, Subsidence, or Depressions None noted

(4) Surface Cracks or Movement at Toe None noted

(5) Seepage None noted

(6) External Drainage System (Ditches, Trenches, Blanket) None

(7) Condition Around Outlet Structure Generally good, minor erosion along slopes

(8) Seepage Beyond Toe None noted

e. Abutments - Embankment Contact

Generally good condition, spring noted in left abutment above top of dam elevation

(1) Erosion at Contact None noted

(2) Seepage Along Contact None noted

3) Drainage System

(a) Description of System 4 ft. wide, trench drain with 8 in. perforated pipe

(b) Condition of System Could not be assessed, zero discharge probably not significant since no signs of seepage were noted.

(c) Discharge from Drainage System None

4) Instrumentation (Momumentation/Surveys, Observation Wells, Weirs, Piczometers, etc.) None installed

) Reservoir

a. Slopes Appear stable and in good condition

b. Sedimentation Very minor accumulation

c. Unusual Conditions Which Affect Dam None noted

) Area Downstream of Dam

a. Downstream Hazard (No. of homes, highways, etc) Refer to Table 5.1 for a summary of downstream dwellings and highways

b. Seepage, unusual growth None noted

c. Evidence of movement beyond toe of Dam None noted

d. Conditions of Downstream Channel Erosion of right stream bank, should be regraded and slope protection provided

7) Spillway(s) (including Discharge Conveyance Channel)

Principal Spillway: Drop inlet structure with outlet conduit to impact basin

Emergency Spillway: Vegetated earth, 200 ft. wide

a. General Good

b. Condition of Service Spillway Excellent

c. Condition of Auxiliary Spillway Good

d. Condition of Discharge Conveyance Channel Good with minimum erosion

) Reservoir Drain/Outlet

Type: Pipe x Conduit ____ Other ____

Material: Concrete x Metal ____ Other ____

Size: 18" Ø Length 40+

Invert Elevations: Entrance 1354.5 Exit 1353.78

Physical Condition (Describe): Unobservable x

Material: ____

Joints: ____ Alignment ____

Structural Integrity: ____

Hydraulic Capability: ____

Means of Control: Gate ____ Valve x Uncontrolled ____

Operation: Operable ____ Inoperable x Other ____

Present Condition (Describe): No handle

9) Structural

a. Concrete Surfaces N/a

b. Structural Cracking N/A

c. Movement - Horizontal & Vertical Alignment (Settlement) N/A

d. Junctions with Abutments or Embankments N/A

e. Drains - Foundation, Joint, Face N/A

f. Water Passages, Conduits, Sluices N/A

g. Seepage or Leakage N/A

h. Joints - Construction, etc. N/A

i. Foundation N/A

j. Abutments N/A

k. Control Gates N/A

l. Approach & Outlet Channels N/A

m. Energy Dissipators (Plunge Pool,etc) N/A

n. Intake Structures N/A

o. Stability N/A

p. Miscellaneous N/A

10) Appurtenant Structures (Power House, Lock, Gatchouse, Other)

a. Description and Condition None.

APPENDIX B

ENGINEERING DATA

APPENDIX B

CONEWANGO CREEK WATERSHED PROJECT

FLOODWATER RETARDING DAM

SITE 9A

DRAINAGE AREA	3840 Acres
FLOOD STORAGE (TO EMERGENCY SPILLWAY CREST)	612 Ac Ft
WATER SURFACE AREA (SEDIMENT POOL)	9 Acres
HEIGHT OF DAM	~~42~~ 43 Feet
VOLUME OF FILL	174,319 Cu Yds

BUILT UNDER THE WATERSHED PROTECTION AND FLOOD PREVENTION ACT

BY

CONEWANGO CREEK WATERSHED COMMISSION

WITH THE ASSISTANCE OF THE

SOIL CONSERVATION SERVICE

OF THE

U S DEPARTMENT OF AGRICULTURE

(SITE 9A)

INDEX

HED PROJECT

M

3840 Acres
612 Ac Ft

9 Acres

43
~~42~~ Feet
174,319 Cu Yds

CTION AND

OMMISSION

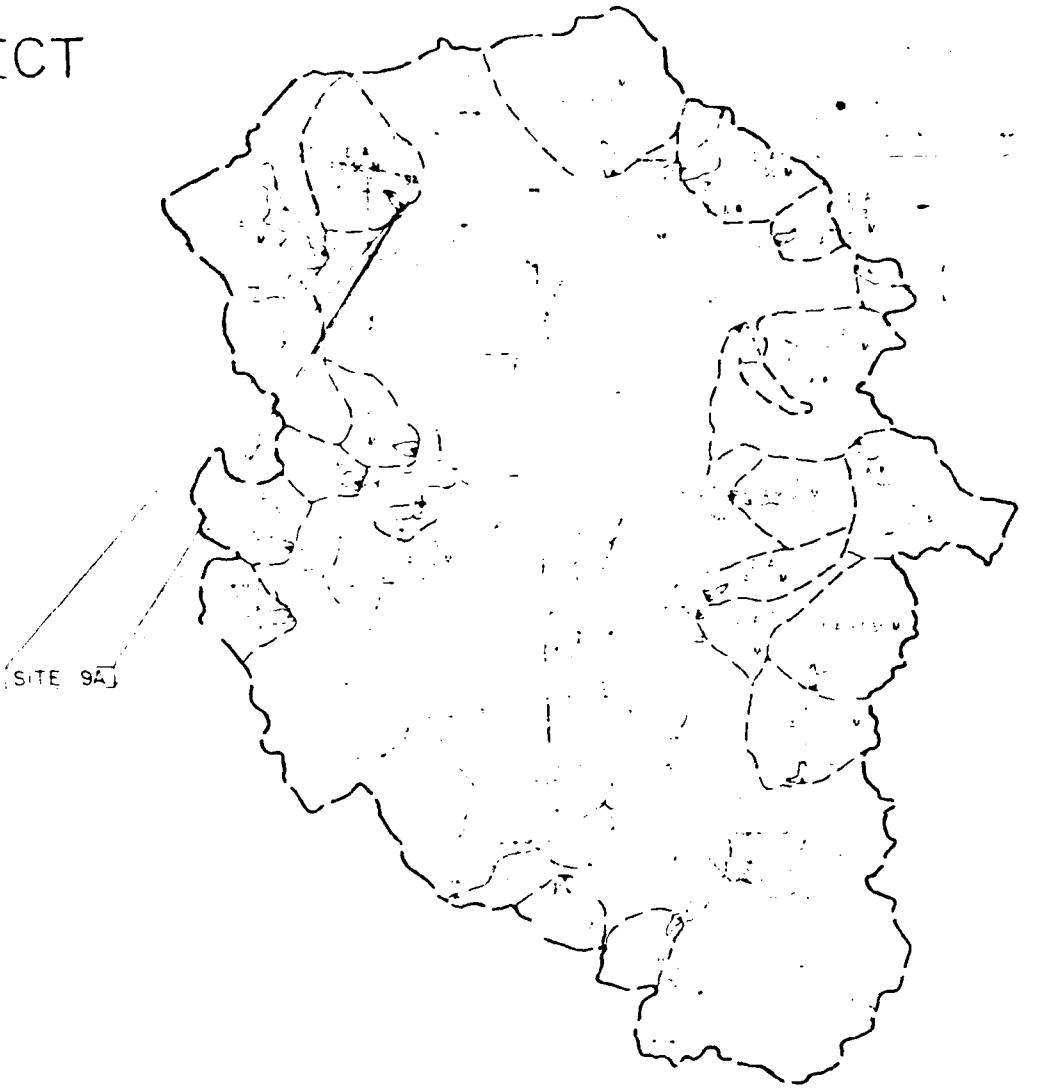
E

RE

WAY EXCAVATION

AY

S



LOCS OF TEST HOLES

AS BUILT
8/22/74

APPR. 72 SHEETS 2, 3, 5 & 6	
DATE ITEM	APP'D
REVISION	

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
COVER SHEET
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

...TOENNIESSEN 11/71
...WILLIAM TURNER 11/71

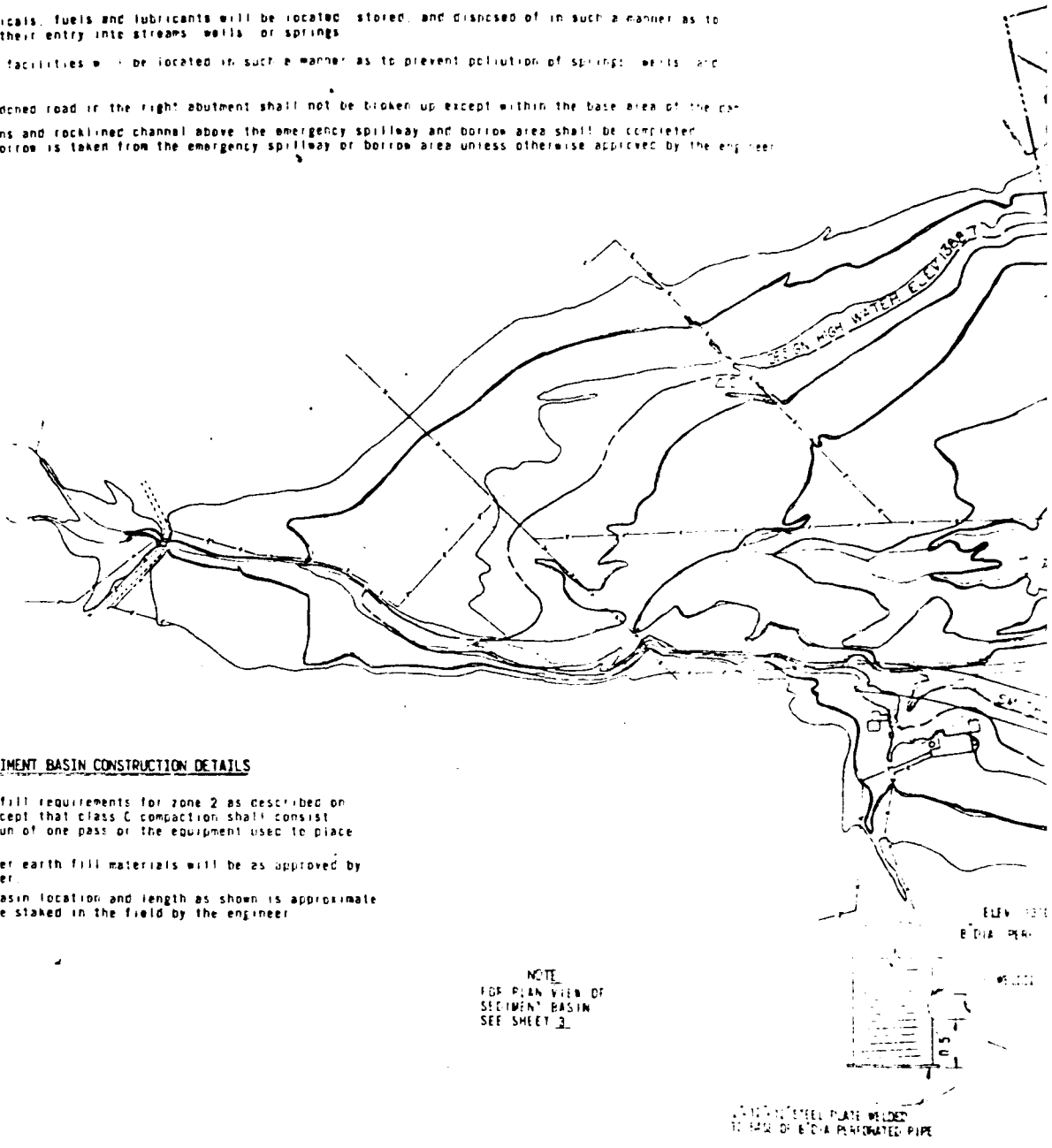
NY-216-P

2

B-2

CONSTRUCTION DETAILS

1. Areas under the dam and levee, emergency spillway, and borrow excavation including 15 feet outside the cut and fill slopes shall be cleared and grubbed. Limits of area to be cleared and grubbed to be staked in the field by the engineer.
2. The waste area and the area upstream from the dam and below elevation 1067.0 or such other elevation as may be directed by the engineer shall be cleared. Limits of area to be cleared shall be staked in the field by the engineer.
3. Depths and limits of borrow excavation shall be determined in the field by the engineer at the time of construction. At the completion of earth fill operations, the borrow area will be left gently sloping, generally smooth and free draining. Side slopes shall be no steeper than 3:1.
4. Bottom section of emergency spillway to be covered with 6" of topsoil from sta. 3+50 to approx. sta. 6+40.
5. Waste areas to be graded so as to prevent ponding.
6. The contractor will sprinkle or apply dust suppressors on Haul Roads and at the site as necessary to reduce pollution of the air.
7. All chemicals, fuels and lubricants will be located, stored, and disposed of in such a manner as to prevent their entry into streams, wells, or springs.
8. Sanitary facilities will be located in such a manner as to prevent pollution of springs, wells, and streams.
9. The abandoned road in the right abutment shall not be broken up except within the base area of the dam.
10. Diversions and rocklined channel above the emergency spillway and borrow area shall be completed before borrow is taken from the emergency spillway or borrow area unless otherwise approved by the engineer.

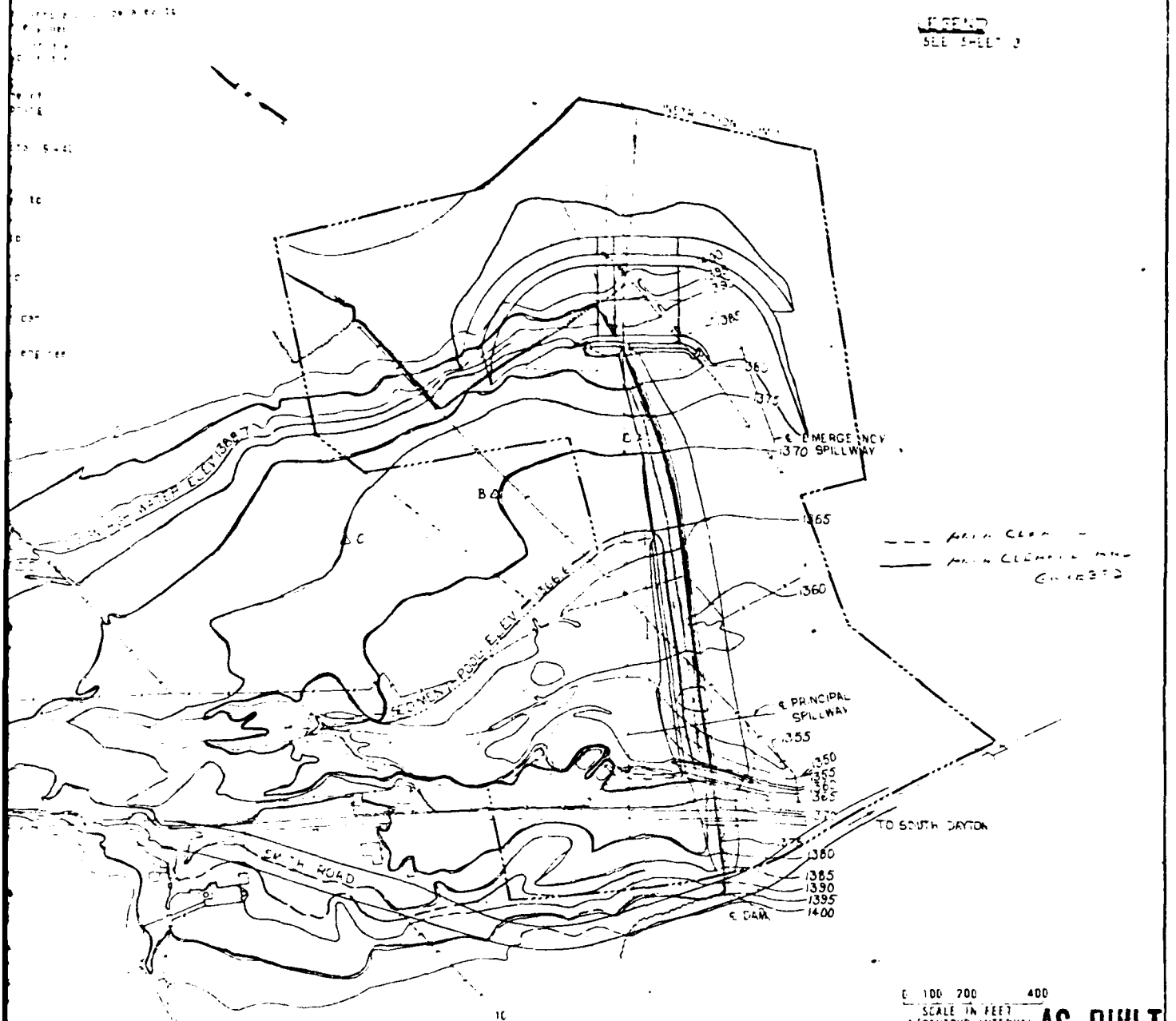


SEDIMENT BASIN CONSTRUCTION DETAILS

1. Use earth fill requirements for zone 2 as described on sheet 7 except that class C compaction shall consist of a minimum of one pass of the equipment used to place the fill.
2. Use of other earth fill materials will be as approved by the engineer.
3. Sediment basin location and length as shown is approximate and will be staked in the field by the engineer.

NOTE
FOR PLAN VIEW OF SEDIMENT BASIN SEE SHEET 3

STEEL PLATE WELDED TO END OF 8" DIA PERFORATED PIPE



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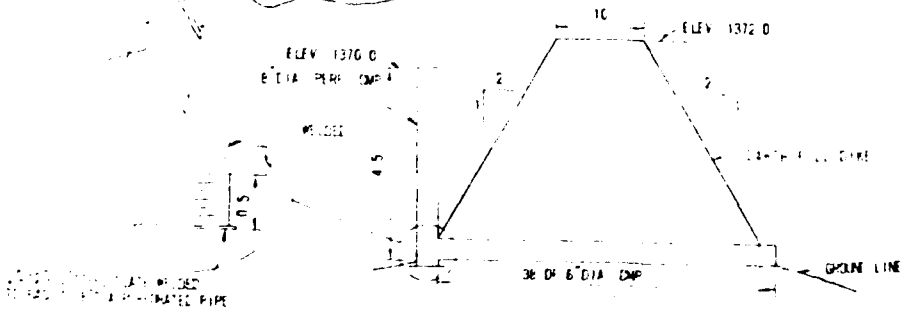
8/24/73



SEDIMENT BASIN DETAILS
(NOT TO SCALE)

2

DATE	ITEM	APP'D
	REVISION	

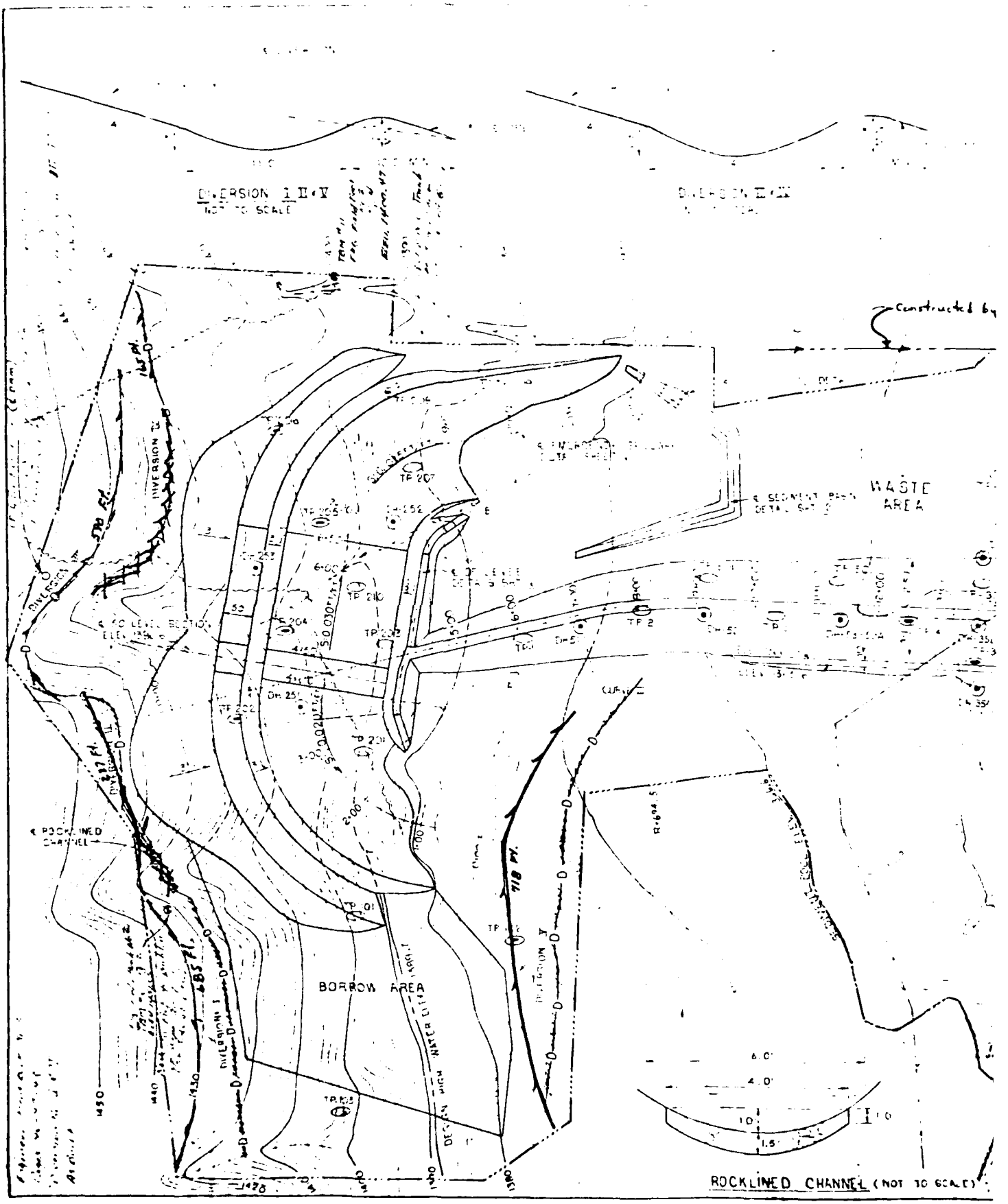
CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
PLAN OF STORAGE AREA

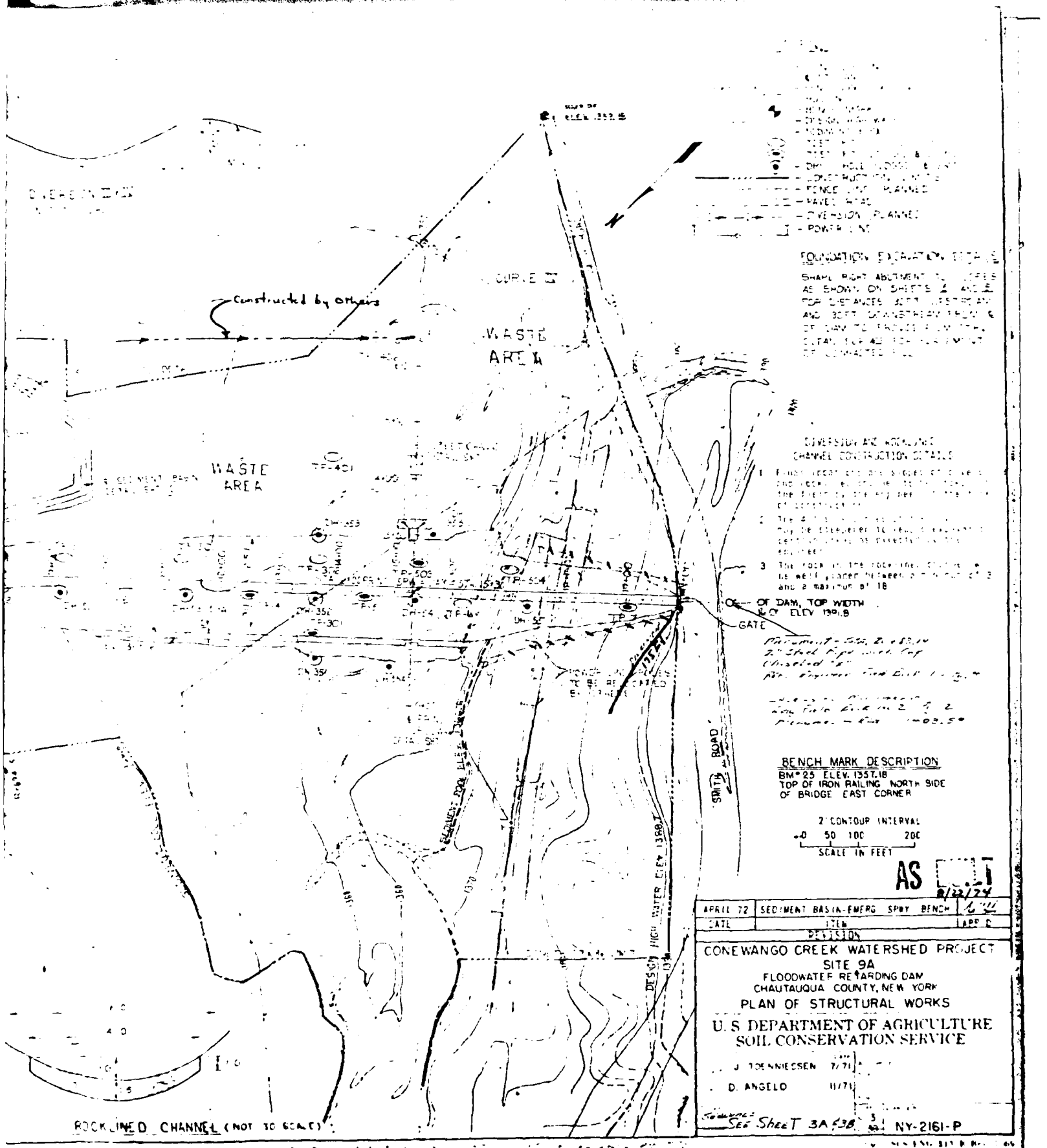
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

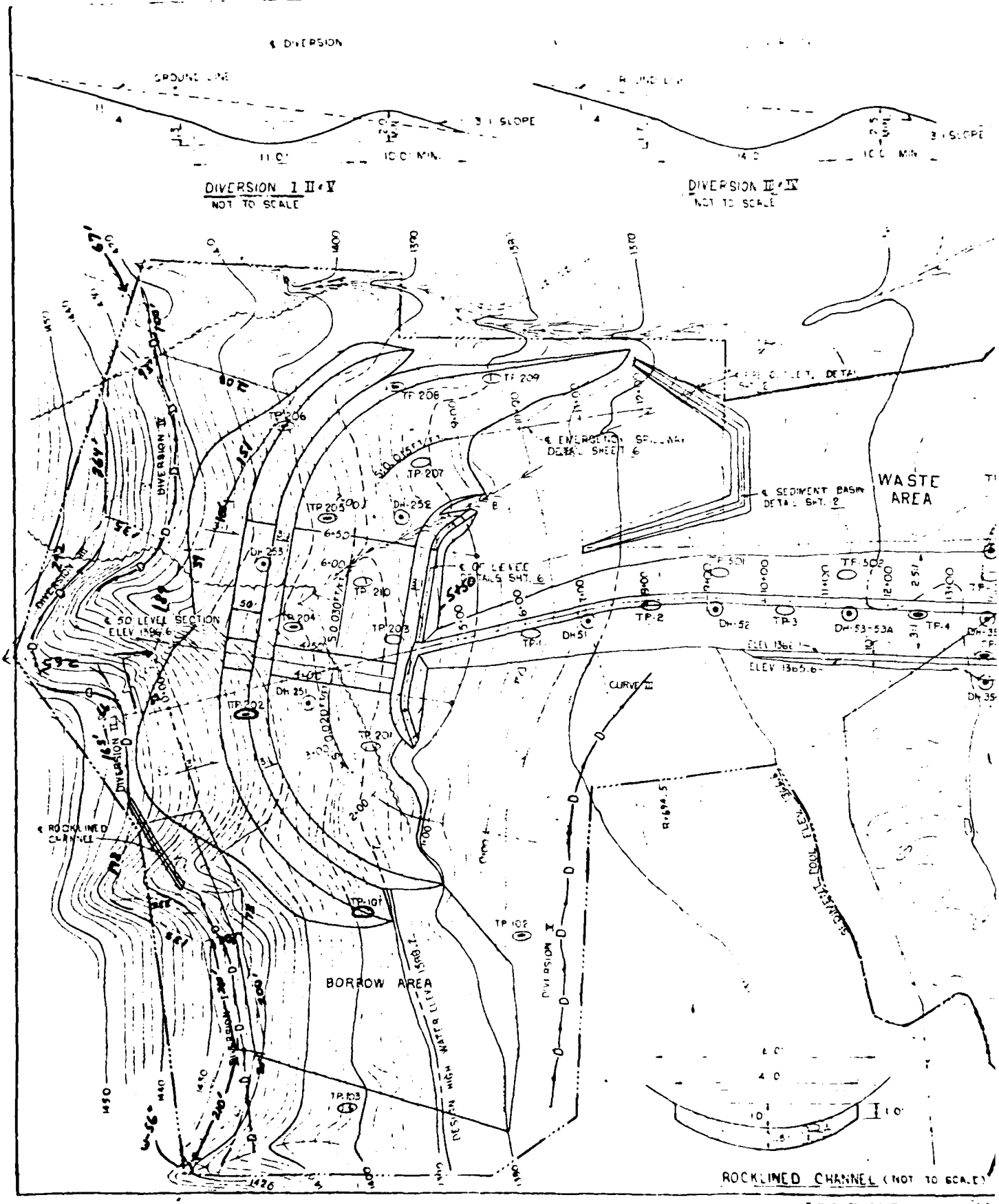
DESIGNED	J TOENNIESSEN	6/71
DRAWN	D BURDICK	6/71
TRACED	D BURDICK	6/71

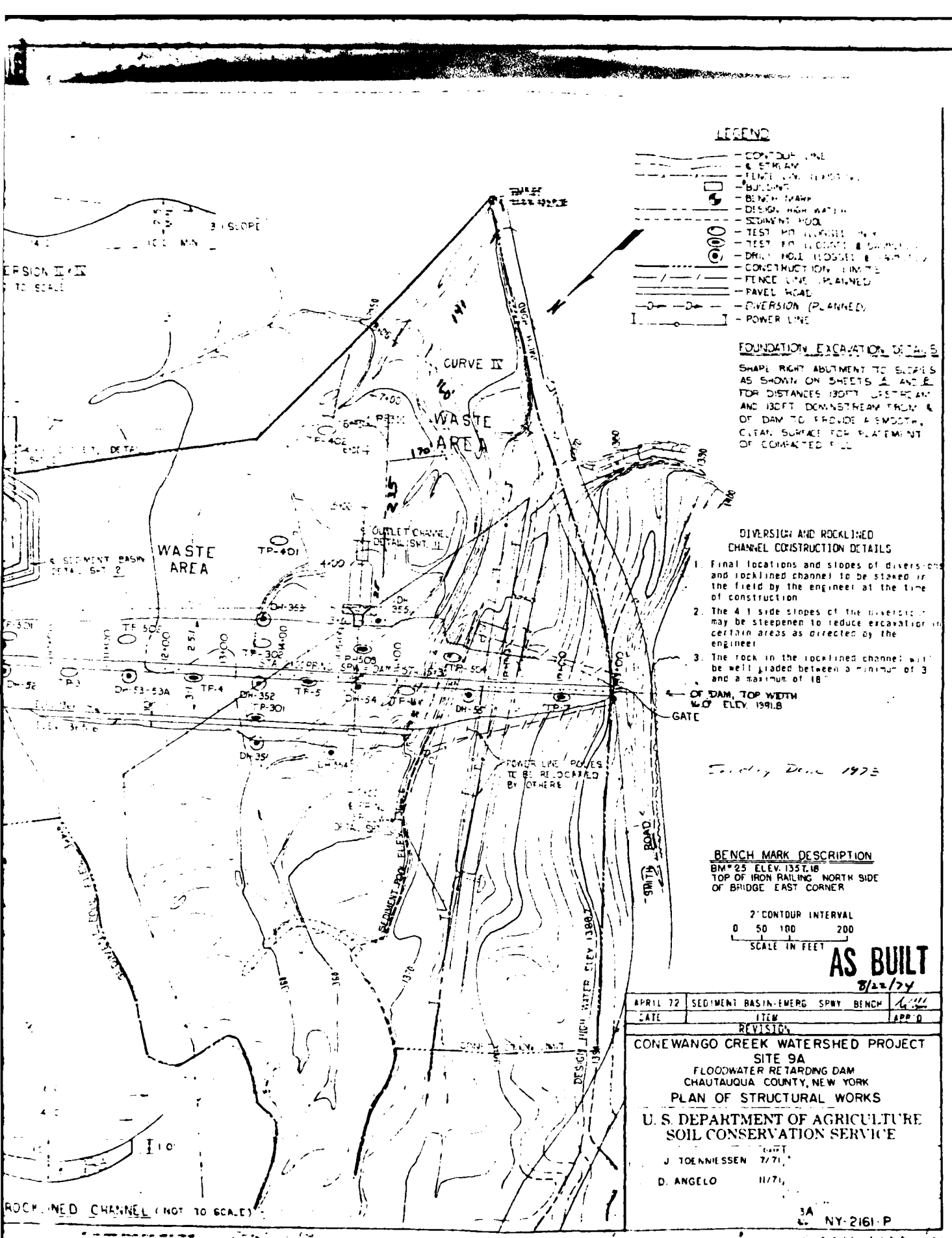
SHEET 2 NY-2161-P

B-3


DIVERSION I, II, V
NOT TO SCALE
DIVERSION III, IV
Constructed by
WASTE AREA
BORROW AREA
ROCKLINED CHANNEL
DIVERSION I
DIVERSION II
DIVERSION III
DIVERSION IV
DIVERSION V
DESIGN HIGH WATER ELEV. 1969.2
ROCKLINED CHANNEL (NOT TO SCALE)


Constructed by others
WASTE AREA
WASTE AREA
OF DAM, TOP WIDTH
GATE
SMITH ROAD
BENCH MARK DESCRIPTION
BM# 25 ELEV. 1357.18
TOP OF IRON RAILING NORTH SIDE
OF BRIDGE EAST CORNER
2' CONTOUR INTERVAL
0 50 100 200
SCALE IN FEET
FOUNDATION EXCAVATION DETAILS
DIVERSION AND ROCK-LINED CHANNEL CONSTRUCTION DETAILS
ROCK LINED CHANNEL (NOT TO SCALE)
APRIL 72 SEDIMENT BASIN-EMERG SPWY BENCH
DATE ITEM
DESIGNED
CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
PLAN OF STRUCTURAL WORKS
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
J. JOENNIESSEN 7/71
D. ANGELO 11/71
SEE SHEET 3A 4 3B
NY-2161-P
B-4


℄ DIVERSION
GROUND LINE
3:1 SLOPE
DIVERSION I II & V
NOT TO SCALE
DIVERSION III & IV
NOT TO SCALE
WASTE AREA
BORROW AREA
℄ SEDIMENT BASIN DETAIL SHT. 8
℄ EMERGENCY SPILLWAY DETAIL SHEET 6
℄ OF LEVEE DETAILS SHT. 6
℄ 50 LEVEE SECTION ELEV 1396.6
℄ ROCKLINED CHANNEL
DESIGN HIGH WATER LEVEL 1380.2
ELEV 1365.6
ROCKLINED CHANNEL (NOT TO SCALE)


LEGEND
CONTOUR LINE
STREAM
BUILDING
BENCH MARK
DESIGN HIGH WATER
SEDIMENT POOL
CONSTRUCTION LIMITS
FENCE LINE (PLANNED)
PAVED ROAD
DIVERSION (PLANNED)
POWER LINE
FOUNDATION EXCAVATION DETAILS
SHAPE RIGHT ABUTMENT TO SLOPES AS SHOWN ON SHEETS 4 AND 5 FOR DISTANCES 130FT UPSTREAM AND 130FT DOWNSTREAM FROM ℄ OF DAM TO PROVIDE A SMOOTH, CLEAN SURFACE FOR PLACEMENT OF COMPACTED FILL
DIVERSION AND ROCKLINED CHANNEL CONSTRUCTION DETAILS
1. Final locations and slopes of diversions and rocklined channel to be staked in the field by the engineer at the time of construction
2. The 4:1 side slopes of the diversion may be steepened to reduce excavation in certain areas as directed by the engineer
3. The rock in the rocklined channel will be well graded between a minimum of 3" and a maximum of 18"
CURVE II
WASTE AREA
OUTLET CHANNEL DETAIL SHT. 11
℄ SEDIMENT BASIN DETAIL SHT. 2
OF DAM, TOP WIDTH ELEV. 1391.8
GATE
POWER LINE POLES TO BE RELOCATED BY OTHERS
SMITH ROAD
SEDIMENT POOL ELEV. 1380.7
DESIGN HIGH WATER ELEV. 1384.7
BENCH MARK DESCRIPTION
BM#25 ELEV. 1357.18
TOP OF IRON RAILING NORTH SIDE OF BRIDGE EAST CORNER
2' CONTOUR INTERVAL
0 50 100 200
SCALE IN FEET
AS BUILT
8/22/74
APRIL 72 | SEDIMENT BASIN-EMERG SPWY BENCH
DATE | ITEM | APP'D
REVISION
CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
PLAN OF STRUCTURAL WORKS
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
DRAFT
J. TOENNIESSEN 7/71
D. ANGELO 11/71
SA NY-2161-P
B-5
ROCKLINED CHANNEL (NOT TO SCALE)

LAYOUT DATA CURVE I

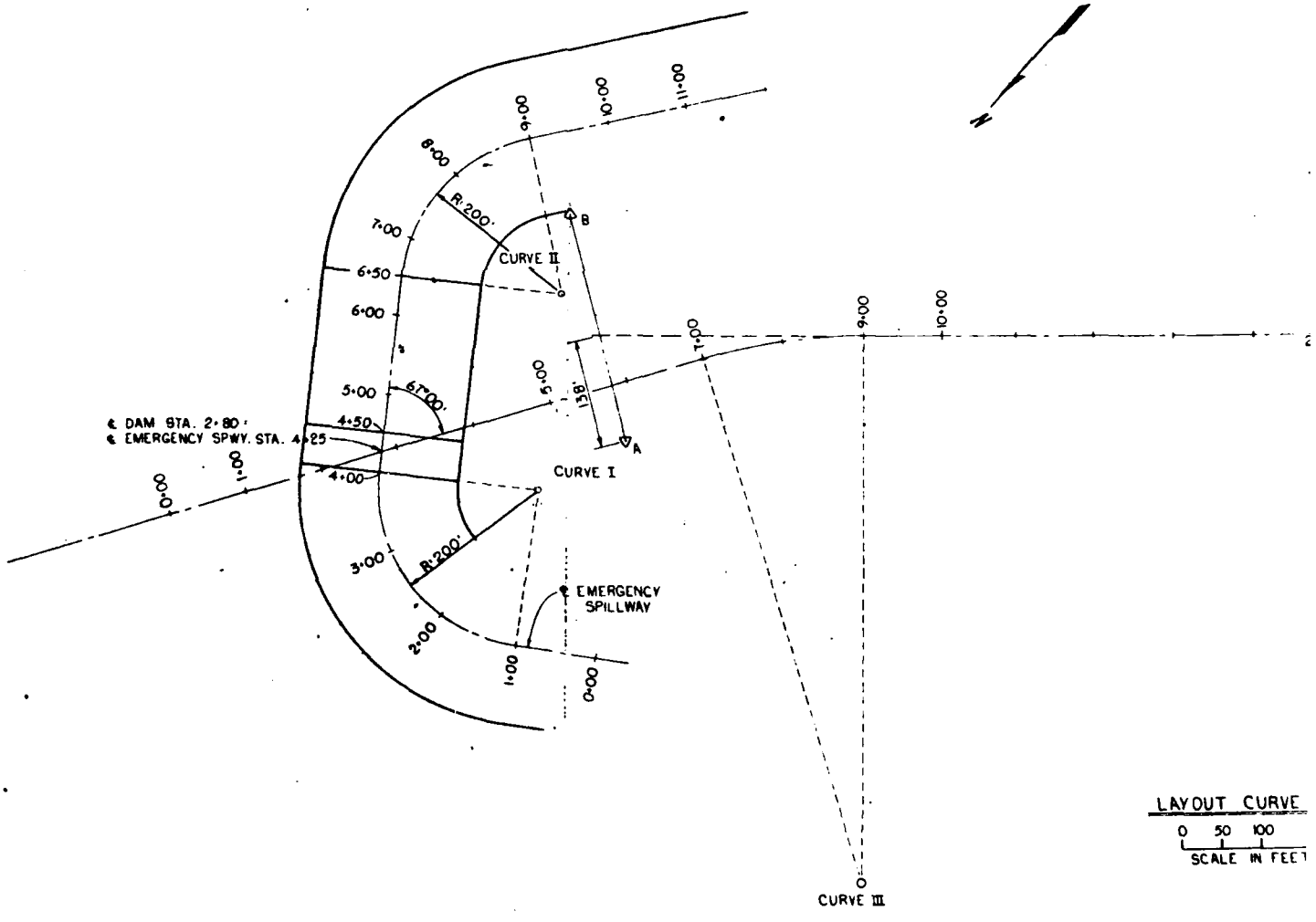
Δ = 85° 57' T = 186.54'
R = 200' E = 73.55'
D = 28° 39' M = 53.67'
L = 300'

℄ STATION	DEFLECTION ∢	CHORD DIST.
1+00	0° 00'	—
1+50	7° 10'	49.87
2+00	14° 20'	"
2+50	21° 29'	"
3+00	28° 39'	"
3+50	35° 49'	"
4+00	42° 58.5'	"

LAYOUT DATA CURVE II

Δ = 71° 37' T = 144.51'
R = 200' E = 46.63'
D = 28° 39' M = 37.81'
L = 250'

℄ STATION	DEFLECTION ∢	CHORD DIST.
6+50	0° 00'	—
7+00	7° 10'	49.87
7+50	14° 20'	"
8+00	21° 29'	"
8+50	28° 39'	"
9+00	35° 48.75	"



LAYOUT DATA CURVE II

Δ = 1° 57'
R = 200'
D = 28° 39'

T = 144.31'
C = 46.63'
M = 37.81'
L = 250'

TATION	DEFLECTION ∠	CHORD DIST.
·50	0° 00'	—
·00	7° 10'	49.87
·50	14° 20'	
·00	21° 29'	
·50	28° 39'	
·00	35° 48.75'	

LAYOUT DATA CURVE III

Δ = 16° 30'
R = 694.5
D = 8° 15'

T = 100.6'
C = 7.22'
M = 7.15'
L = 200.0'

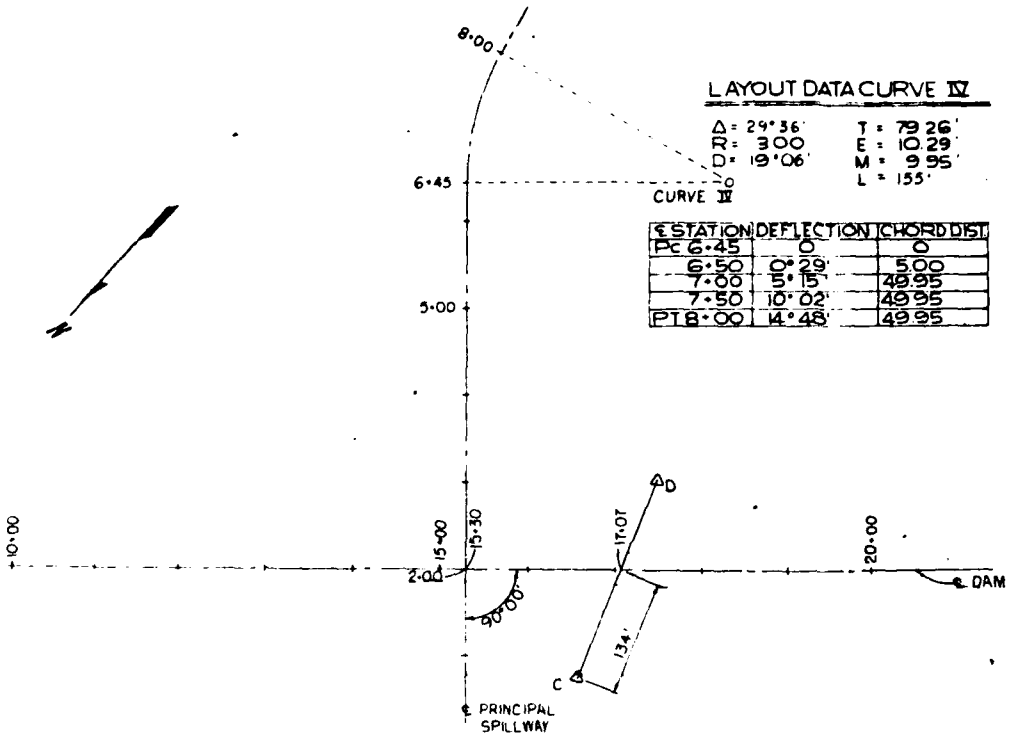
℄ STATION	DEFLECTION ∠	CHORD DIST.
9·00	0° 00'	—
8·50	2° 04'	50.00
8·00	4° 08'	
7·50	6° 11'	
7·00	8° 15'	

LAYOUT DATA CURVE IV

Δ = 29° 36'
R = 300
D = 19° 06'

T = 79.26'
E = 10.29'
M = 9.95'
L = 155'

℄ STATION	DEFLECTION	CHORD DIST.
PC 6·45	0	0
6·50	0° 29'	5.00
7·00	5° 15'	49.95
7·50	10° 02'	49.95
PT 8·00	14° 48'	49.95



LAYOUT CURVE DATA

0 50 100 200
SCALE IN FEET

9/22/74

AS BUILT

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK

LAYOUT DATA

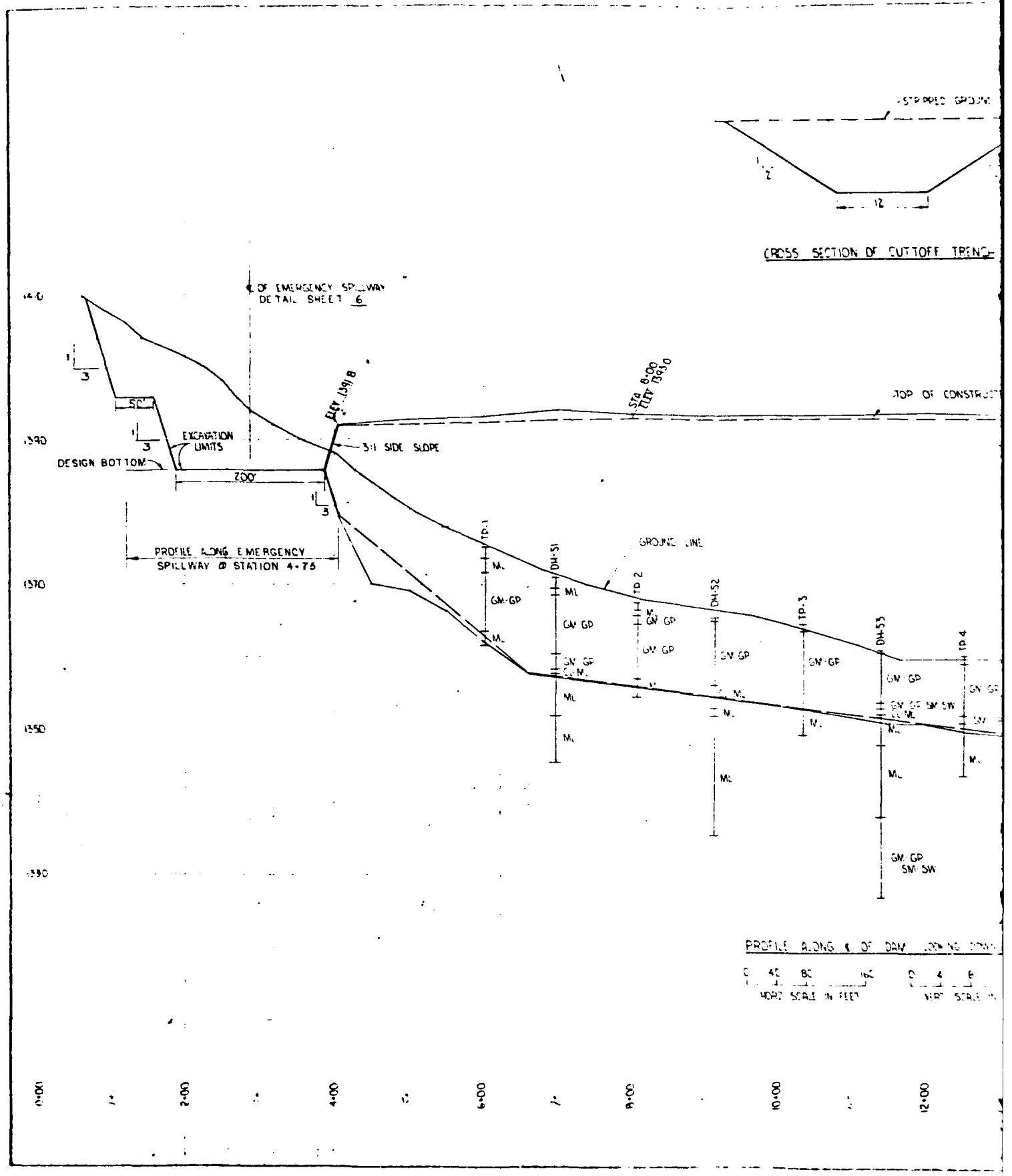
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J. TOENNIESSEN	Date 9/71	Approved by	
Drawn D ANGELO	9/71	Title	
Traced		Title	
Checked		Sheet No. 4 of 10 sheets	Drawing No. NY-2161-P

2

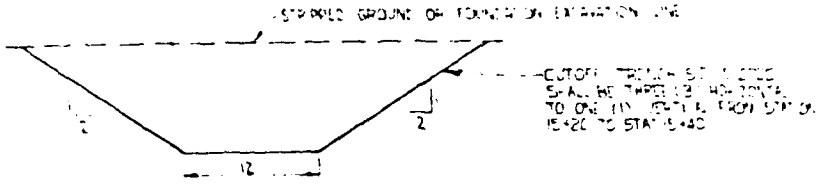
SCS ENG 313-B Rev. 7-65

B-6

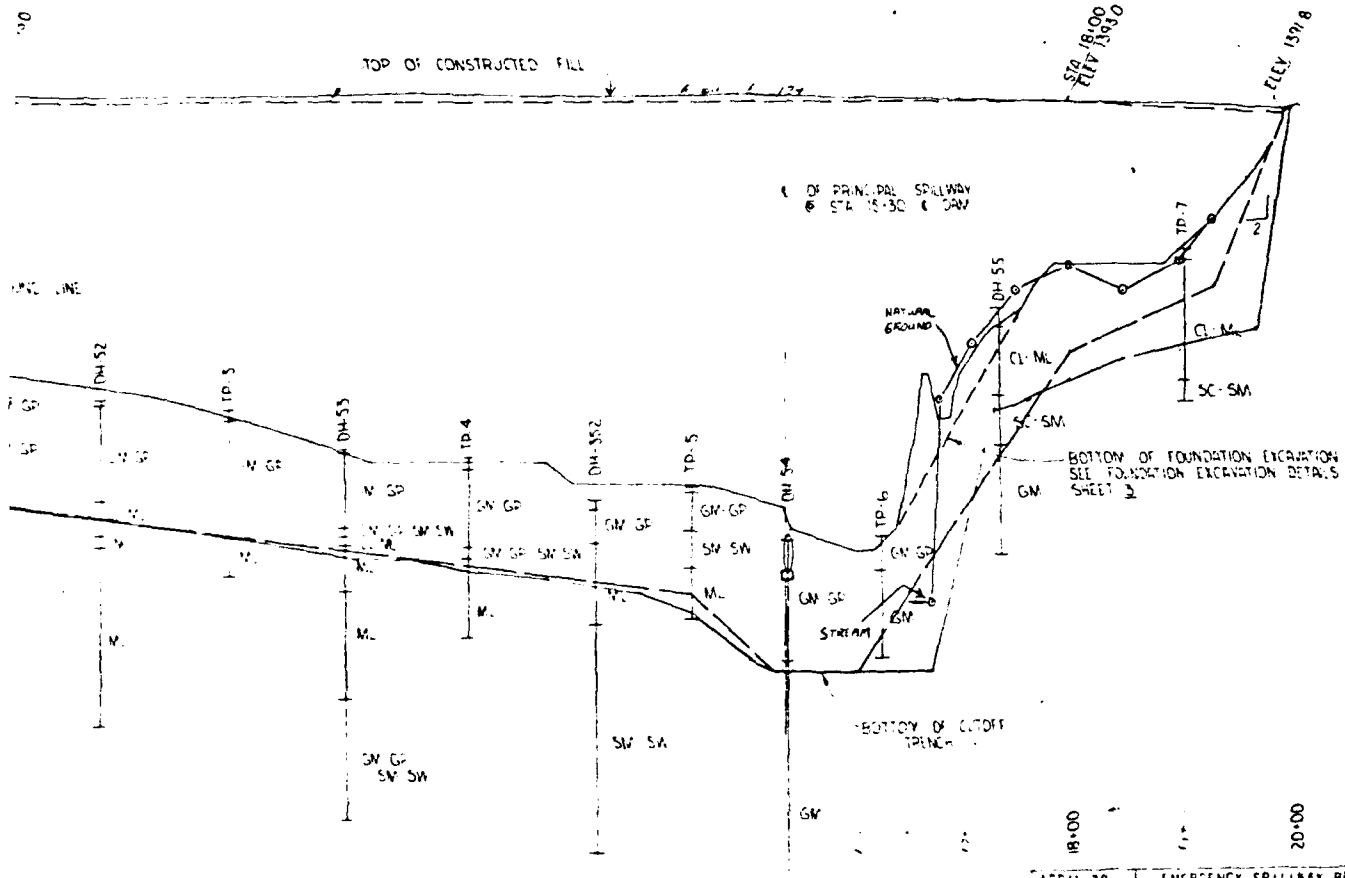

STRIPPED GROUND
1
2
12
CROSS SECTION OF CUTTOFF TRENCH
℄ OF EMERGENCY SPILLWAY
DETAIL SHEET 6
EL. 1391.8
STA 8+00
ELEV 1391.0
TOP OF CONSTRUCT
1390
1370
1350
1330
3
50'
EXCAVATION
LIMITS
DESIGN BOTTOM
200'
3:1 SIDE SLOPE
PROFILE ALONG EMERGENCY
SPILLWAY @ STATION 4+75
GROUND LINE
TP-1
DH-51
TP-2
DH-52
TP-3
DH-53
TP-4
ML
GM-GP
GW-GP
GW GP
SM-SW
PROFILE ALONG ℄ OF DAM LOOKING DOWN
0 40 80 160
HORZ SCALE IN FEET
0 4 8
VERT SCALE IN
0+00
2+00
4+00
6+00
8+00
10+00
12+00

CONSTRUCTION DETAILS

FINAL DEPTH OF TRENCH TO BE ESTABLISHED BY THE ENGINEER AT THE TIME OF CONSTRUCTION



CROSS SECTION OF CUTOFF TRENCH



AS BUILT 5/22/74

DATE	ITEM	APP'D
APRIL 72	EMERGENCY SPILLWAY BENCH	

REVISION

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY NEW YORK
CUTOFF TRENCH EXCAVATION

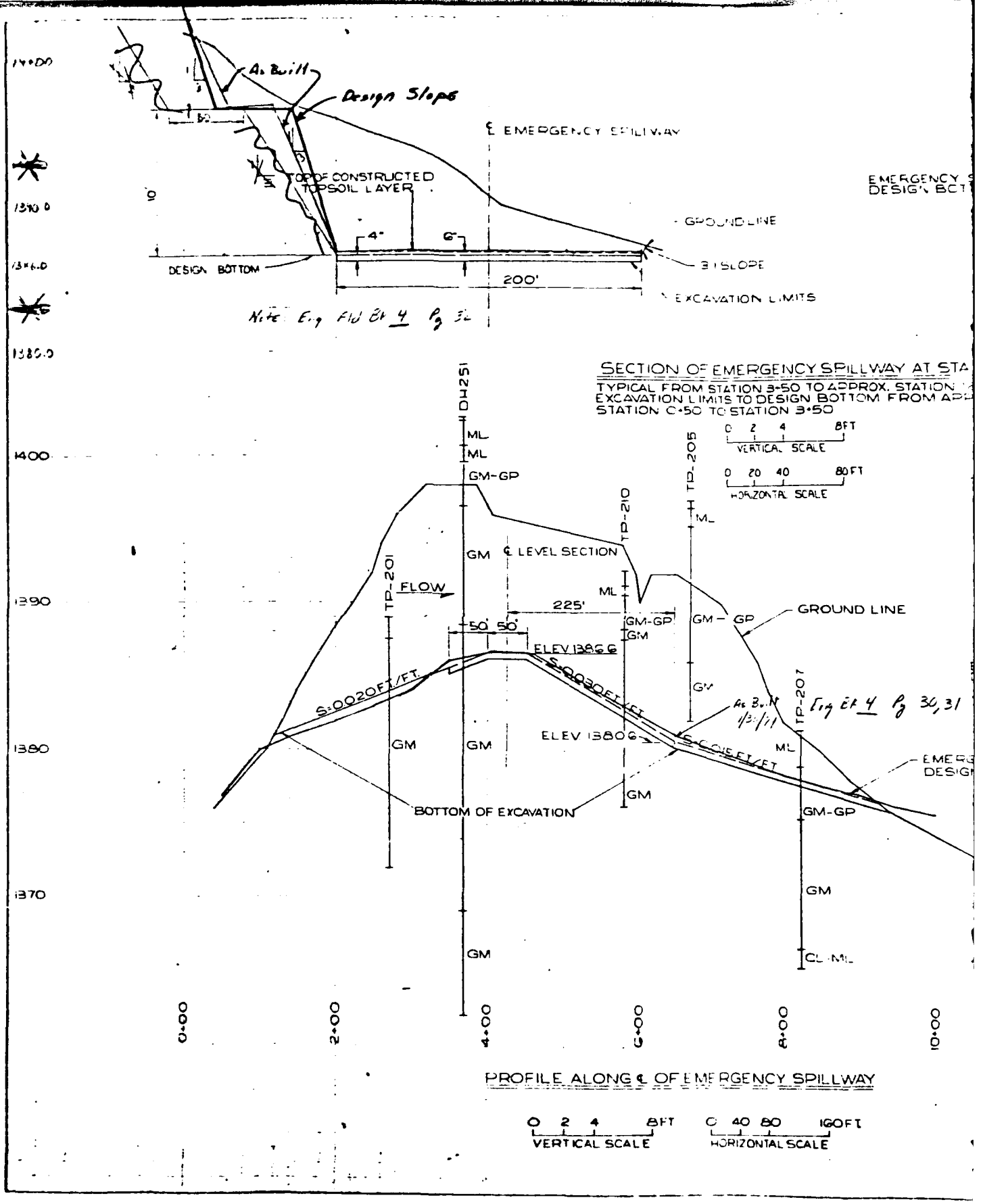
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

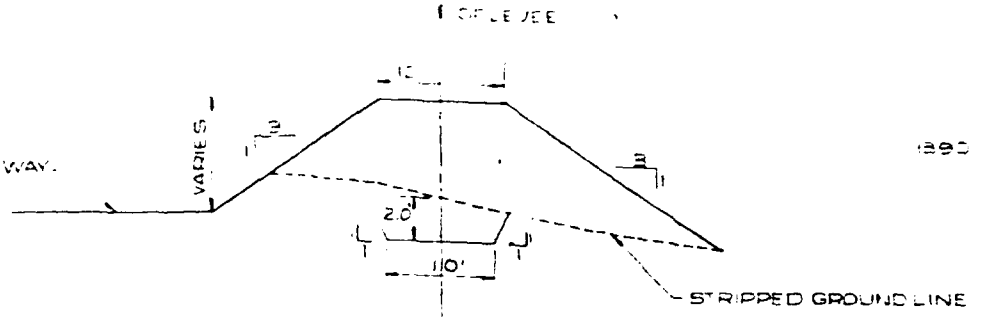
J TOENNESSEN 6/71
W E G 6/71

NY-2161-P

SCS-ENG-Sht Rev. 2-69

B-7


As Built
Design Slope
℄ EMERGENCY SPILLWAY
TOP OF CONSTRUCTED TOPSOIL LAYER
GROUND LINE
4"
6"
DESIGN BOTTOM
3:1 SLOPE
200'
EXCAVATION LIMITS
Note Fig Plt 4 Pg 32
SECTION OF EMERGENCY SPILLWAY AT STA
TYPICAL FROM STATION 3+50 TO APPROX. STATION
EXCAVATION LIMITS TO DESIGN BOTTOM FROM APP
STATION 0+50 TO STATION 3+50
0 2 4 8FT
VERTICAL SCALE
0 20 40 80FT
HORIZONTAL SCALE
TP-201
TP-210
TP-205
TP-207
ML
GM-GP
GM
GP
℄ LEVEL SECTION
FLOW
225'
50' 50'
ELEV 1386.6
ELEV 1380.6
S=.0020FT/FT
S=.0030FT/FT
S=.0060FT/FT
GROUND LINE
BOTTOM OF EXCAVATION
As Built 1/31/11
Fig Plt 4 Pg 30, 31
CL-ML
1400
1390
1380
1370
0+00
2+00
4+00
6+00
8+00
10+00
PROFILE ALONG ℄ OF EMERGENCY SPILLWAY
0 2 4 8FT
VERTICAL SCALE
0 40 80 160FT
HORIZONTAL SCALE



SECTION OF INSIDE LEVEE AT STA 4+50

TYPICAL FROM 50' UPSTREAM OF ℄ LEVEL SECTION TO 280.0' DOWNSTREAM OF ℄ OF LEVEL SECTION

0 2 4 8FT — VERTICAL SCALE

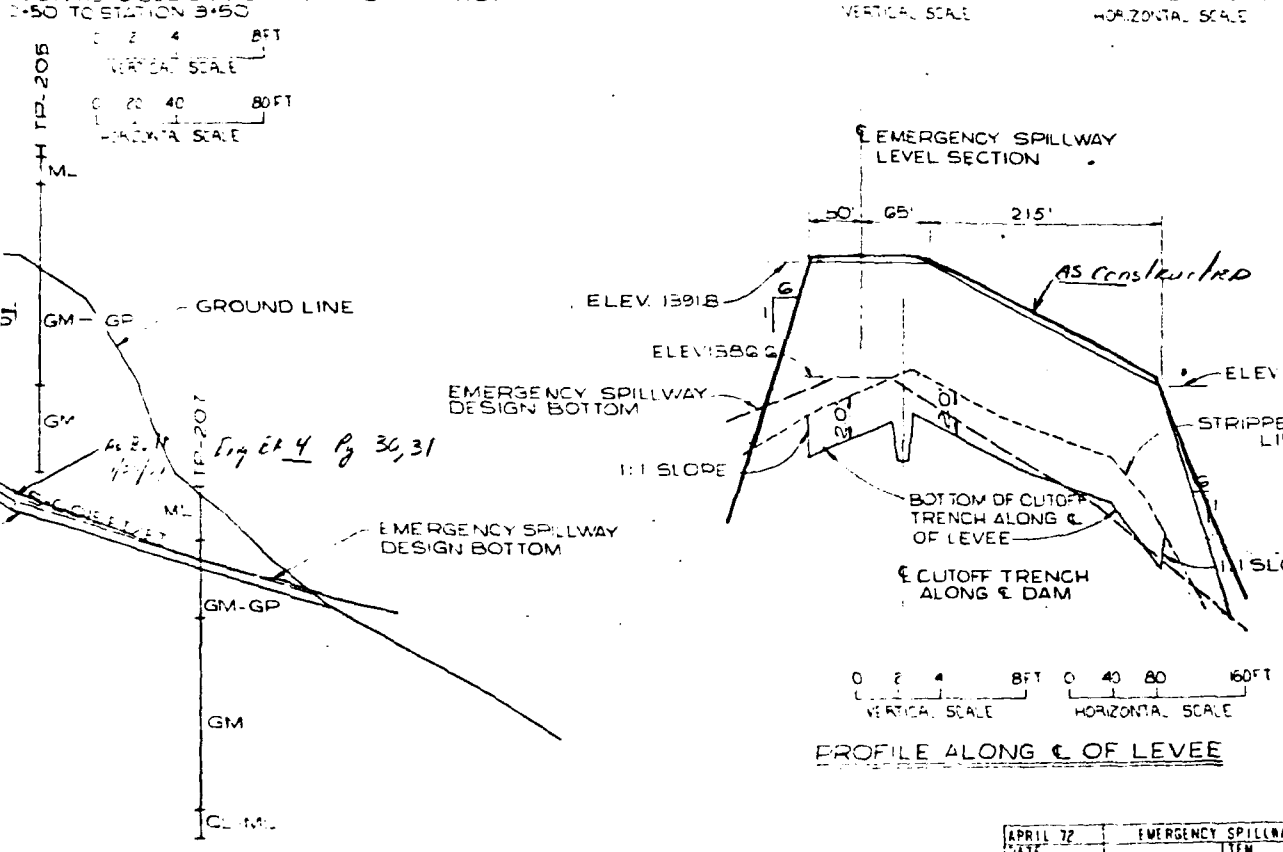
0 4 8 16FT — HORIZONTAL SCALE

N OF EMERGENCY SPILLWAY AT STA 4+25

ROM STATION 3+50 TO APPROX. STATION 12+00
N LIMITS TO DESIGN BOTTOM FROM APPROX
2+50 TO STATION 3+50

0 2 4 8FT — VERTICAL SCALE

0 20 40 80FT — HORIZONTAL SCALE



0 2 4 8FT — VERTICAL SCALE

0 40 80 160FT — HORIZONTAL SCALE

PROFILE ALONG ℄ OF LEVEE

AS BUILT
8/22/74

DATE	ITEM	APPR
APRIL 72	EMERGENCY SPILLWAY BENCH	
	REVISION	

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY NEW YORK
EMERGENCY SPILLWAY

U. S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

J TOENNIESSEN 11/71
WILLIAM TURNER 11/71

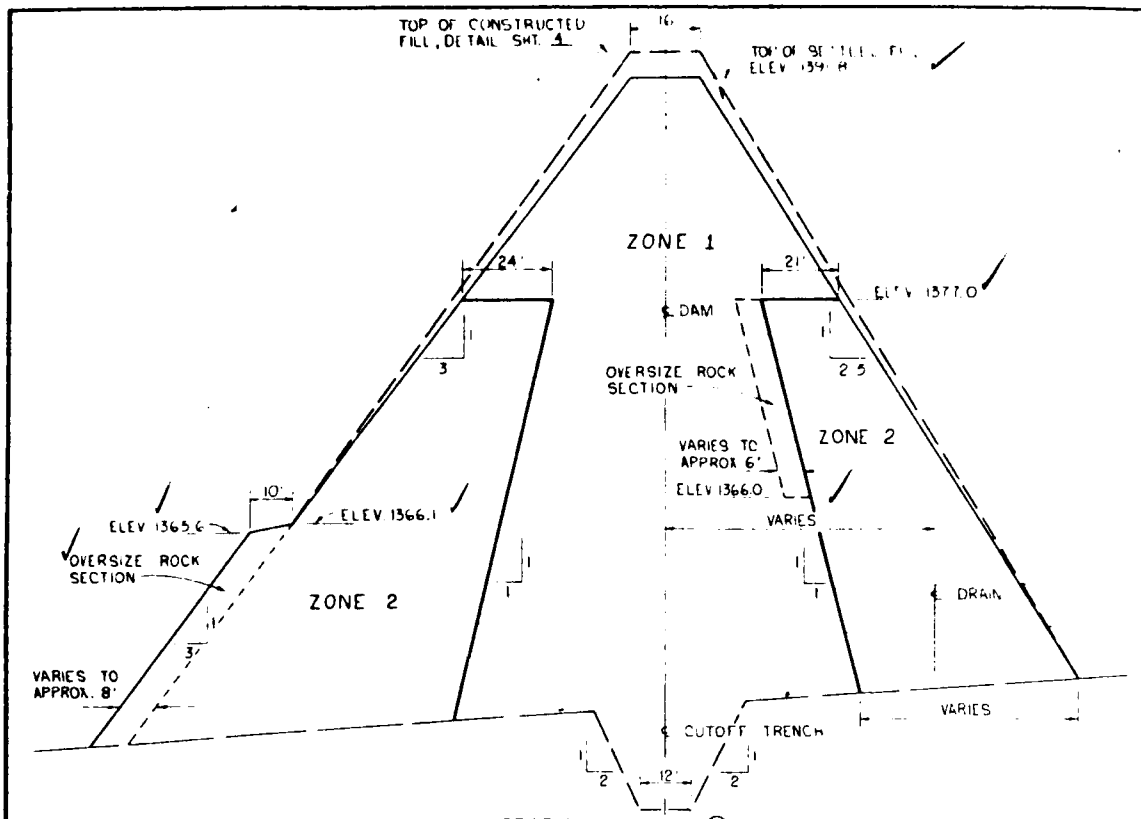
6 NY-2161-P

OF EMERGENCY SPILLWAY

T 0 40 80 160FT
HORIZONTAL SCALE

2

B-8



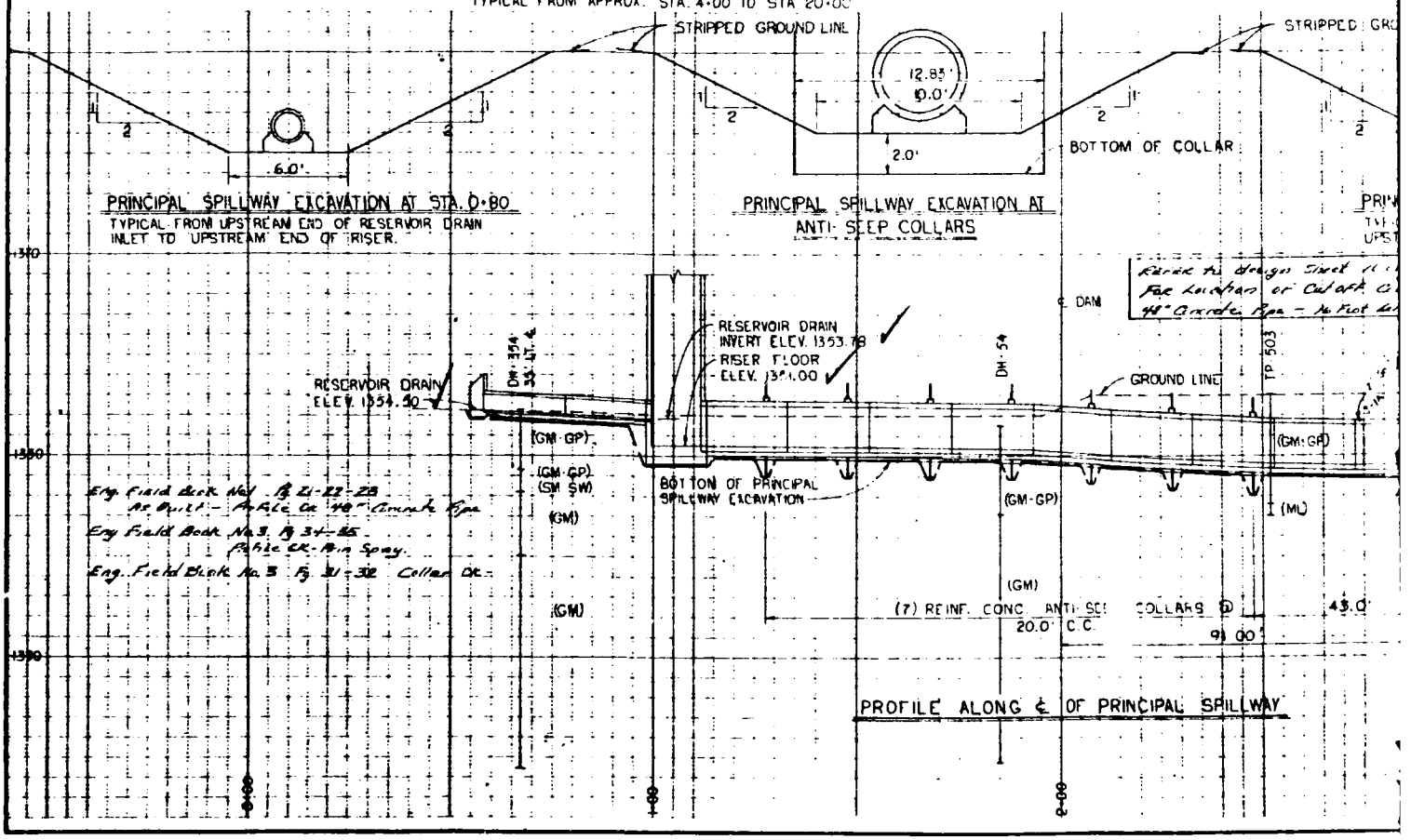
SECTION OF DAM @ STATION 15+00

TYPICAL FROM APPROX. STA. 4+00 TO STA. 20+00

ZONE	MATERIAL
1	GLACIAL TILL RE TP 204 Fro 10 TP 206 Fro 9
2	ALLUVIAL & COL REPRESENTED BY TP 7 From 1 TP 202 From 5 TP 205 From 1 TP 205 From D

1/ The placement
2/ a) Maximum rock
Plate Vibrators s
b) Maximum rock
as shown on the
3/ Maximum lift th
than 18" prior t
4/ water content a
5/ Thoroughly wet
a) Not more tha
at the time of
b) Not so wet as
of equipment
6/ a) For typical c
b) Use CLASS C c
minimum of six
approved by the

1 Zone boundaries a
spillway and borro
2 Material placed
be essentially fre
at the upstream sl
3 Topsoil that is s
slopes of the ea



Eng. Field Book No. 4, Pg 21-23-28
As Built - Public Co. 48" Corrugated Pipe
Eng. Field Book No. 3, Pg 34-35
Public Co. - 8 in Spwy.
Eng. Field Book No. 3 Pg 31-32 Collar Det.

EARTH FILL REQUIREMENTS

ZONE	MATERIAL 1/	MAX ROCK SIZE 2/	MAX LIFT 3/ THICKNESS	MIN REQUIRED WATER 4/ CONTENT	COMPACTION 6/ CLASS	COMPACTION 6/ DEFINITION
1	GLACIAL TILL REPRESENTED BY TP 204 From 10 0-14 4' (SM) TP 206 From 9 0-16 0' (ML)	6"	9"	2 percentage points below optimum	A	98 standard density by ASTM D 698 method A
2	ALLUVIAL & COLLUVIAL MATERIALS REPRESENTED BY TP 7 From 1 0-12 0' (CL ML) TP 202 From 5 5-8 0' (GW GP) TP 205 From 1 8-11 0' (GW-GP) TP 205 From 0 5-1 8' (ML)	6"	9"	Wet 5/	C	Four passes per layer of fill by a smooth wheel vibrating roller at least 72" wide weighing at least one ton (Static Service Weight) per foot of width and capable of exerting a dynamic impact of at least 20 000 pounds at the rate of at least 1 200 times per minute

1/ The placement table indicates estimated use of materials

2/ a) Maximum rock size in backfill compacted by means of manually directed power tampers or Plate Vibrators shall be 3"
b) Maximum rock size of 18" placed in earth fill shall be taken to the portion of the dam labeled OVERSIZE ROCK SECTION as shown on the drawings

3/ Maximum lift thickness prior to compaction. The maximum lift thickness of the oversize rock section shall be no greater than 18" prior to compaction

4/ Water content at time of compaction

5/ Thoroughly wet but
a) Not more than 12 percent moisture content based on the material passing the #4 sieve unless modified by the engineer at the time of construction or
b) Not so wet as to cause adherance of the soil to the wheels or tracks of the equipment, nor to cause bogging down of equipment

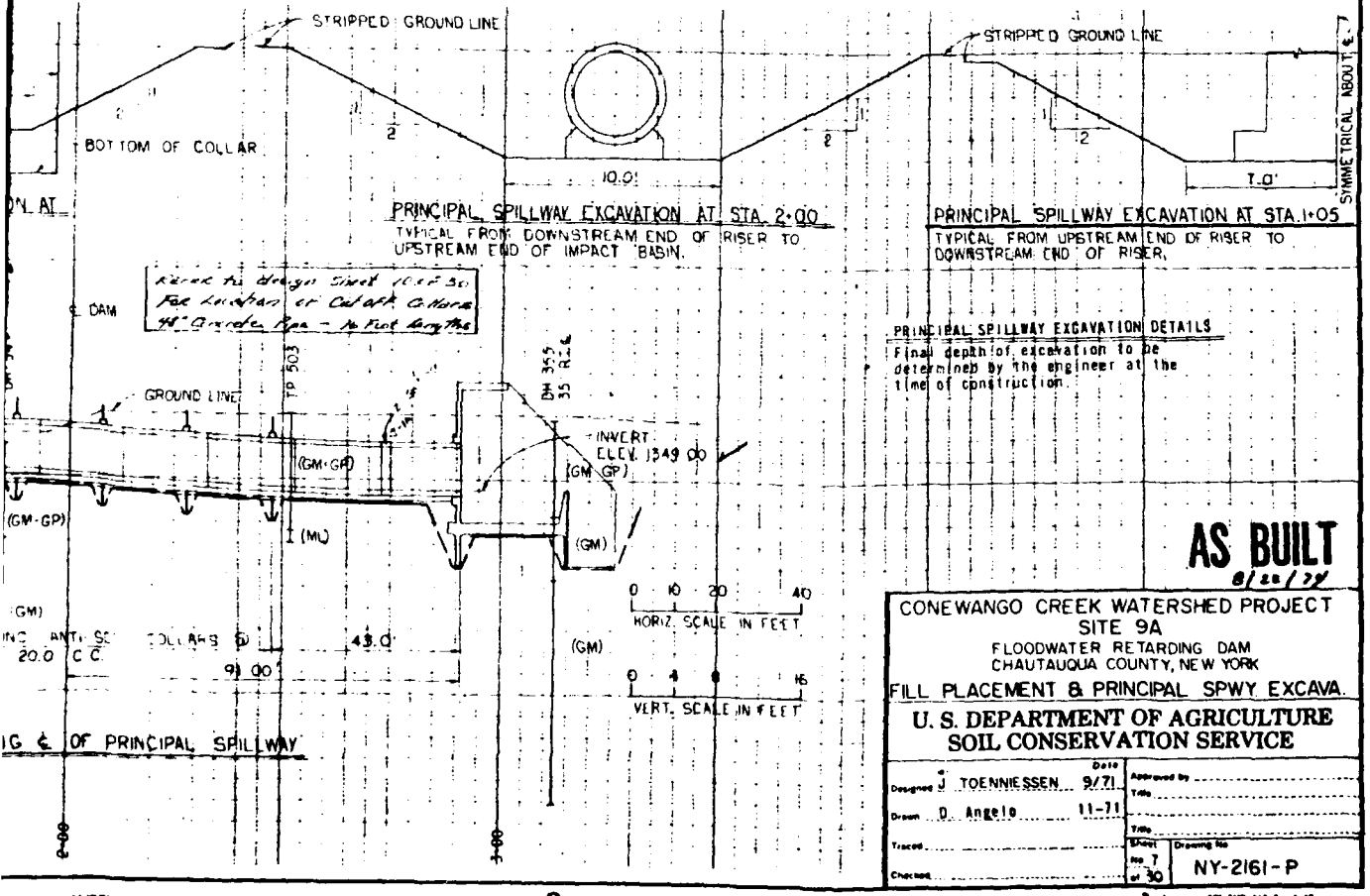
6/ a) For typical compaction curves see sheet 27
b) Use CLASS C compaction in areas of the dam containing oversize material. This CLASS C compaction shall consist of a minimum of six passes per lift of fill by a tamping roller exerting a min. contact pressure of 450PSI or equivalent as approved by the engineer. The final number of passes will be determined by the engineer in the field.

CONSTRUCTION DETAILS

1 Zone boundaries are approx. Adjustments will be made by the engineer to utilize all coarse material from the emergency spillway and borrow area.

2 Material placed in the OVERSIZE ROCK SECTIONS shall consist of oversize material taked from the earth fill. These sections shall be essentially free of material less than 3". Oversize rock section above Elev. 1366 may be relocated so as to be exposed at the upstream slope of the dam as determined by the engineer.

3 Topsoil that is suitable for use and not used on the specified areas of the emerg. spillway shall be incorporated within the slopes of the earth fill as directed by the engineer.



PRINCIPAL SPILLWAY EXCAVATION DETAILS

Final depth of excavation to be determined by the engineer at the time of construction.

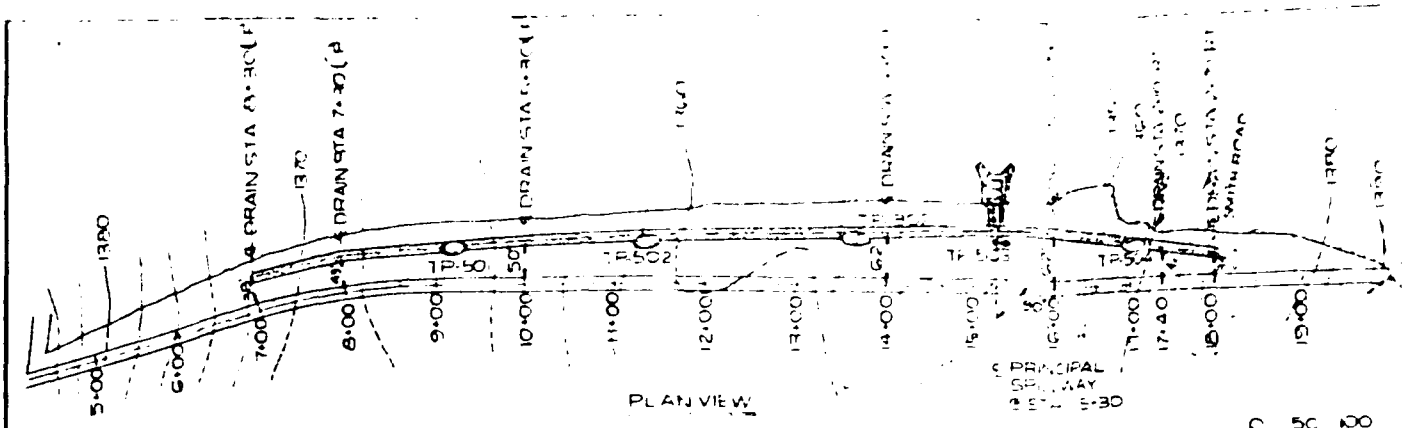
AS BUILT 8/22/74

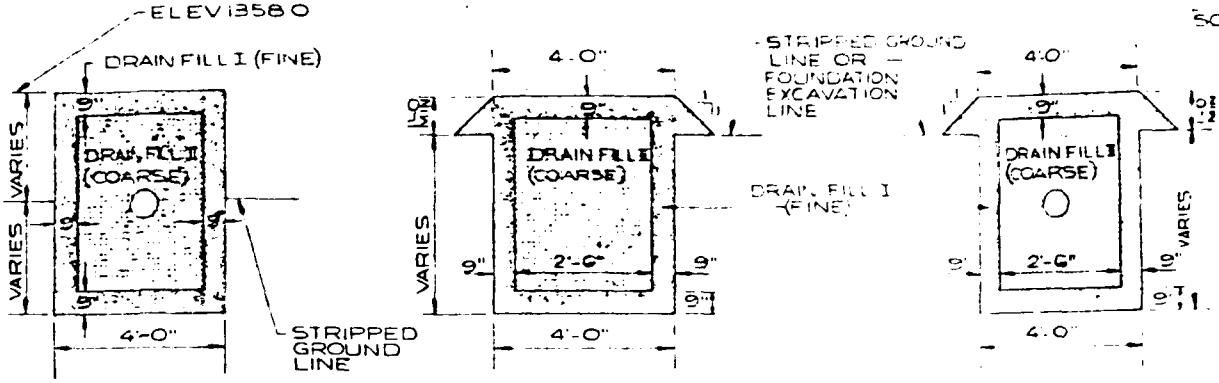
CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK

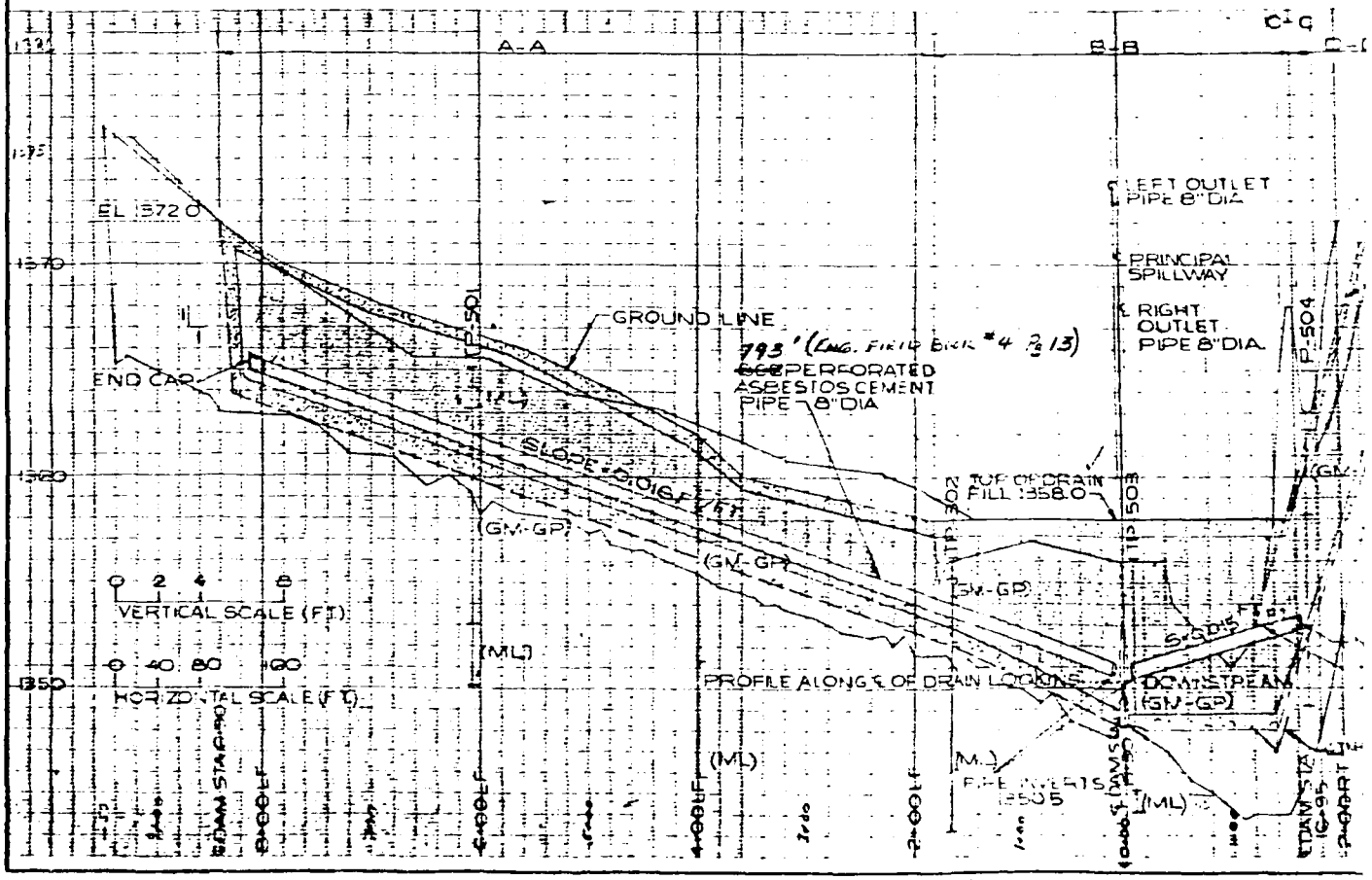
FILL PLACEMENT & PRINCIPAL SPWY EXCAVA.

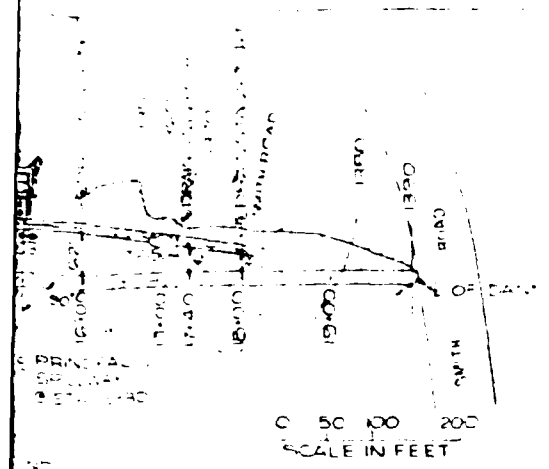
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

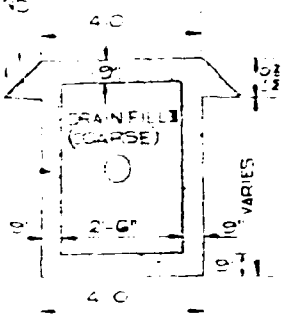
Designed J TOENNIESSEN	Date 9/71	Approved by	
Drawn D. Angelo	11-71	Title	
Traced		Title	
Checked		Sheet No. 7 of 30	Drawing No. NY-2161-P


PLAN VIEW
TP-50
TP-502
TP-503
TP-504
TP-505
PRINCIPAL SPILLWAY


ELEV 1358.0
DRAIN FILL I (FINE)
DRAIN FILL II (COARSE)
VARIES
4'-0"
STRIPPED GROUND LINE
STRIPPED GROUND LINE OR FOUNDATION EXCAVATION LINE
2'-6"
9"
SECTION B-B
SECTION D-D
SECTION C-C
A-A


A-A
B-B
C-C
EL 1372.0
END CAP
GROUND LINE
793' (ENG. FIELD BOOK #4 p 13)
PERFORATED ASBESTOS CEMENT PIPE 8" DIA
LEFT OUTLET PIPE 8" DIA
PRINCIPAL SPILLWAY
RIGHT OUTLET PIPE 8" DIA
TOP OF DRAIN FILL 1358.0
SLOPE = 0.016 F/F
(GM-GP)
(ML)
VERTICAL SCALE (FT)
HORIZONTAL SCALE (FT)
PROFILE ALONG ℄ OF DRAIN LOOKING DOWNSTREAM
TP-501
TP-502
TP-503
TP-504
TP-505





A A
SECTION C-C

DRAINAGE SYSTEM DETAILS

PERFORATED DRAIN PIPE SHALL CONFORM TO [illegible] AND SHALL BE 8" DIA PRESSURE PIPE, CLASS [illegible]

THE PROFILE AT THE BOTTOM OF ALL EXCAVATION AS SHOWN ARE ONLY APPROXIMATE. THE REQUIRED FINISH SHALL BE ESTABLISHED IN THE FIELD AT THE TIME OF CONSTRUCTION BY THE ENGINEER.

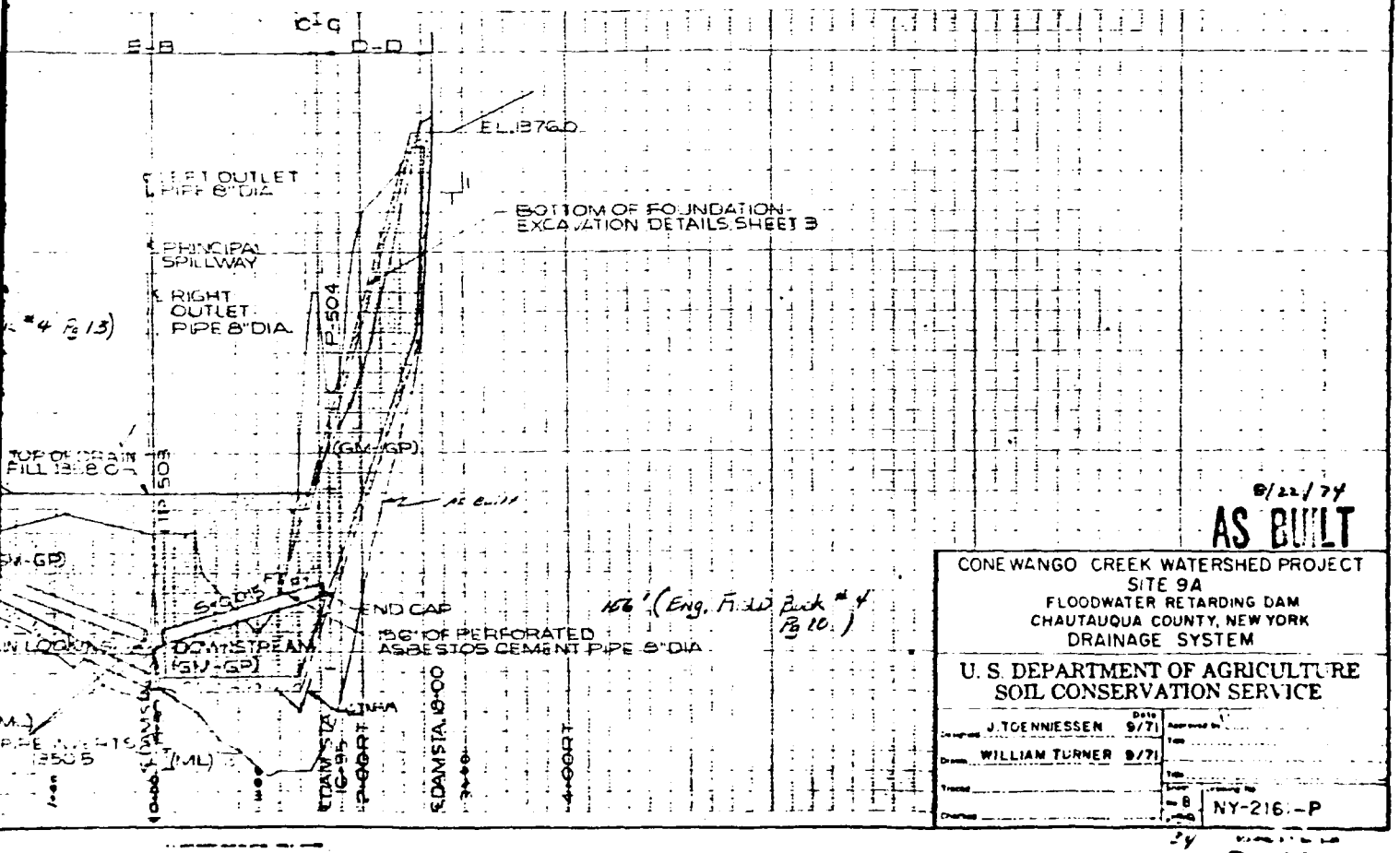
QUANTITY SUMMARY

928 CU YDS DRAIN FILL I (FINE)
847 CU YDS DRAIN FILL II (COARSE)
1069 LIN FT STRAIGHT SECTION OF PERFORATED ASBESTOS CEMENT PIPE (8" DIA)
2 END CAPS
1 90° ELBOWS (8" DIA CAST IRON)
2 45° ELBOWS (8" DIA CAST IRON)

GRAIN SIZE DESCRIPTION FOR DRAIN FILL

DRAIN FILL I (FINE) SHALL MEET THE GRADATION OF A.S.T.M. C 33-67 FOR FINE AGGREGATE. IN ADDITION, THE PERCENTAGE OF MATERIAL IN DRAIN FILL I FINER THAN A # 200 SIEVE SHALL NOT BE MORE THAN THREE (3) PERCENT.

2. DRAIN FILL II (COARSE) SHALL MEET THE GRADATION OF N.Y.S. DOT COARSE AGGREGATE #1. IN ADDITION, THE PERCENTAGE OF MATERIAL IN DRAIN FILL II FINER THAN A # 200 SIEVE SHALL NOT BE MORE THAN THREE (3) PERCENT



8/22/74
AS BUILT

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
DRAINAGE SYSTEM

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	J. TOENNIESSEN	9/71	
Drawn	WILLIAM TURNER	9/71	
Traced			
Checked			

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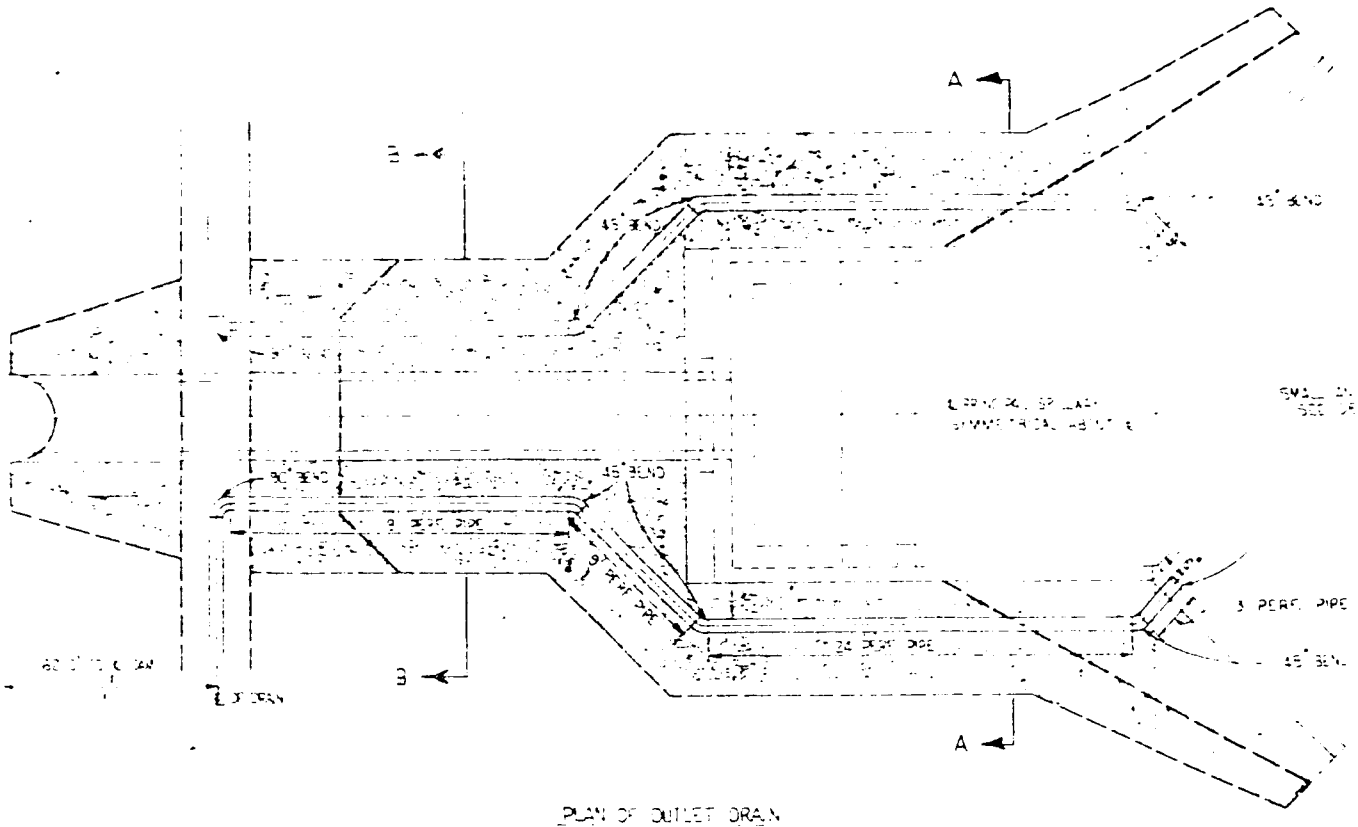
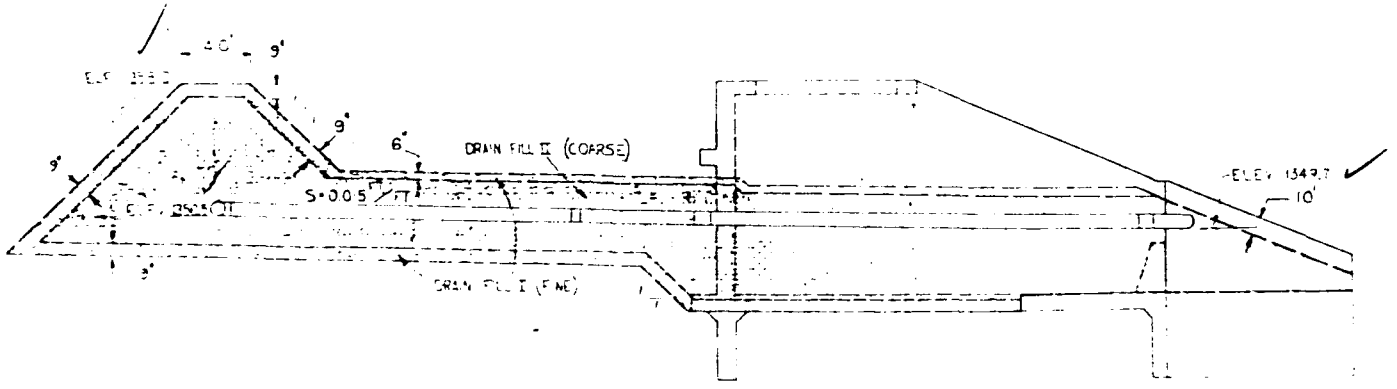
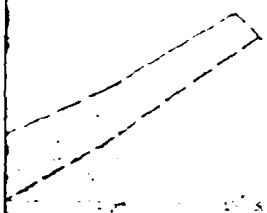
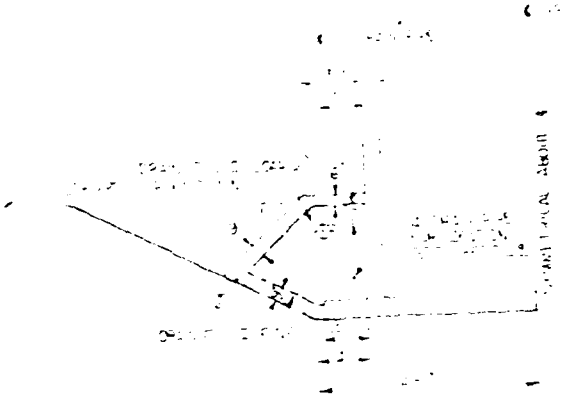


PLAN OF OUTLET DRAIN

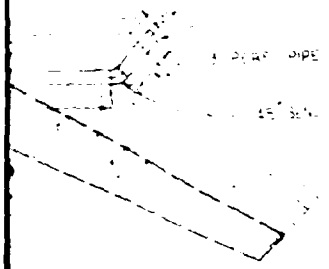


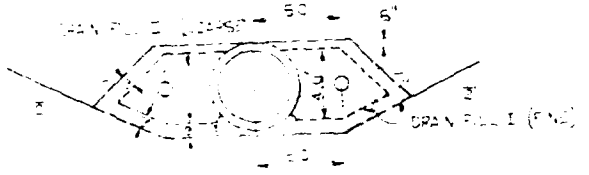
TYPICAL SECTION ALONG OUTLET DRAIN



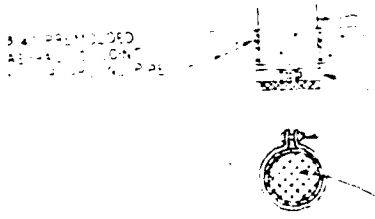


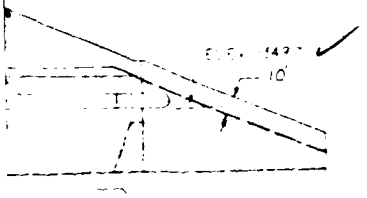
SECTION AA





SECTION BB





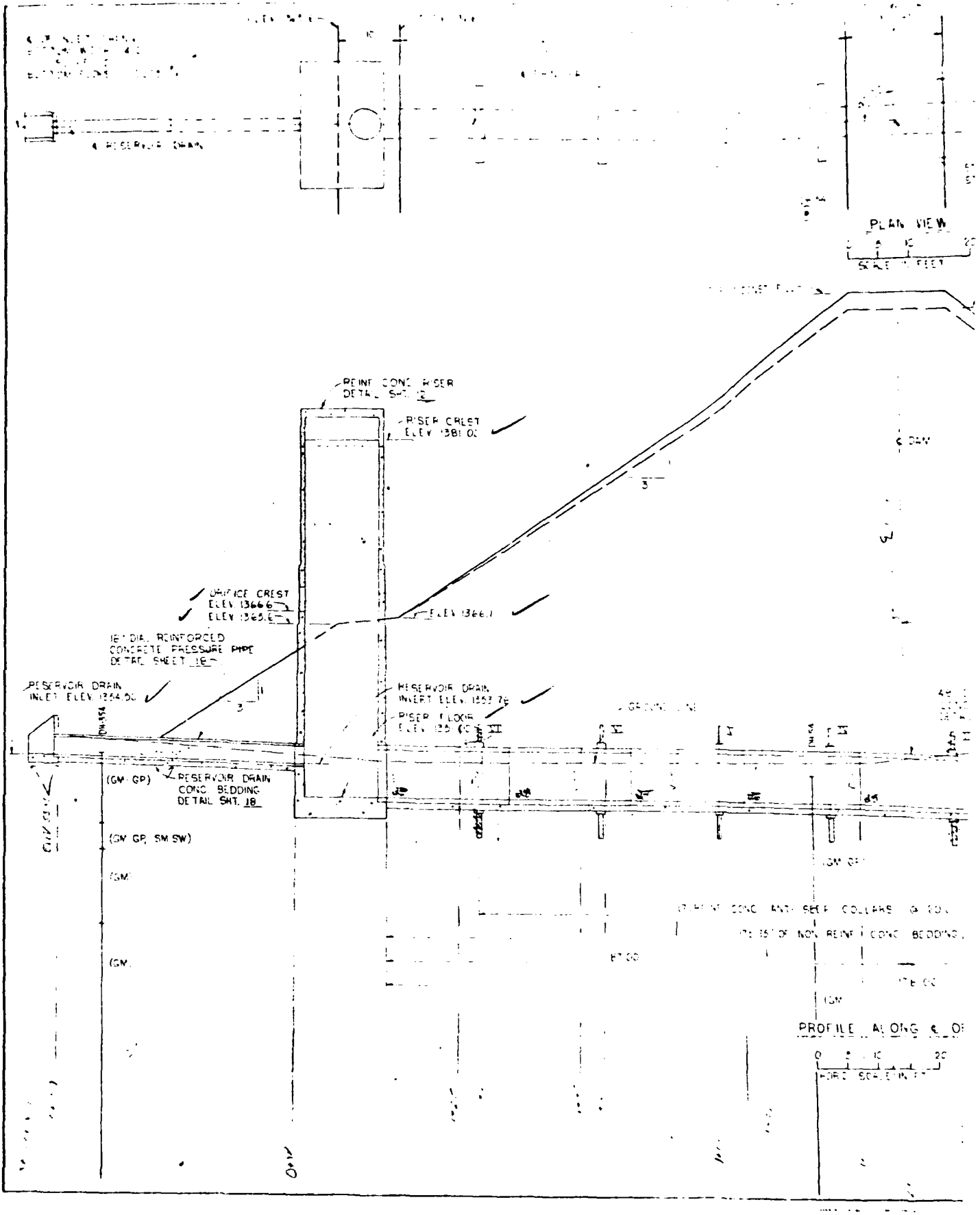
DETAIL OF TRASH RACK SCREEN & OUTLET OF DRAIN PIPE

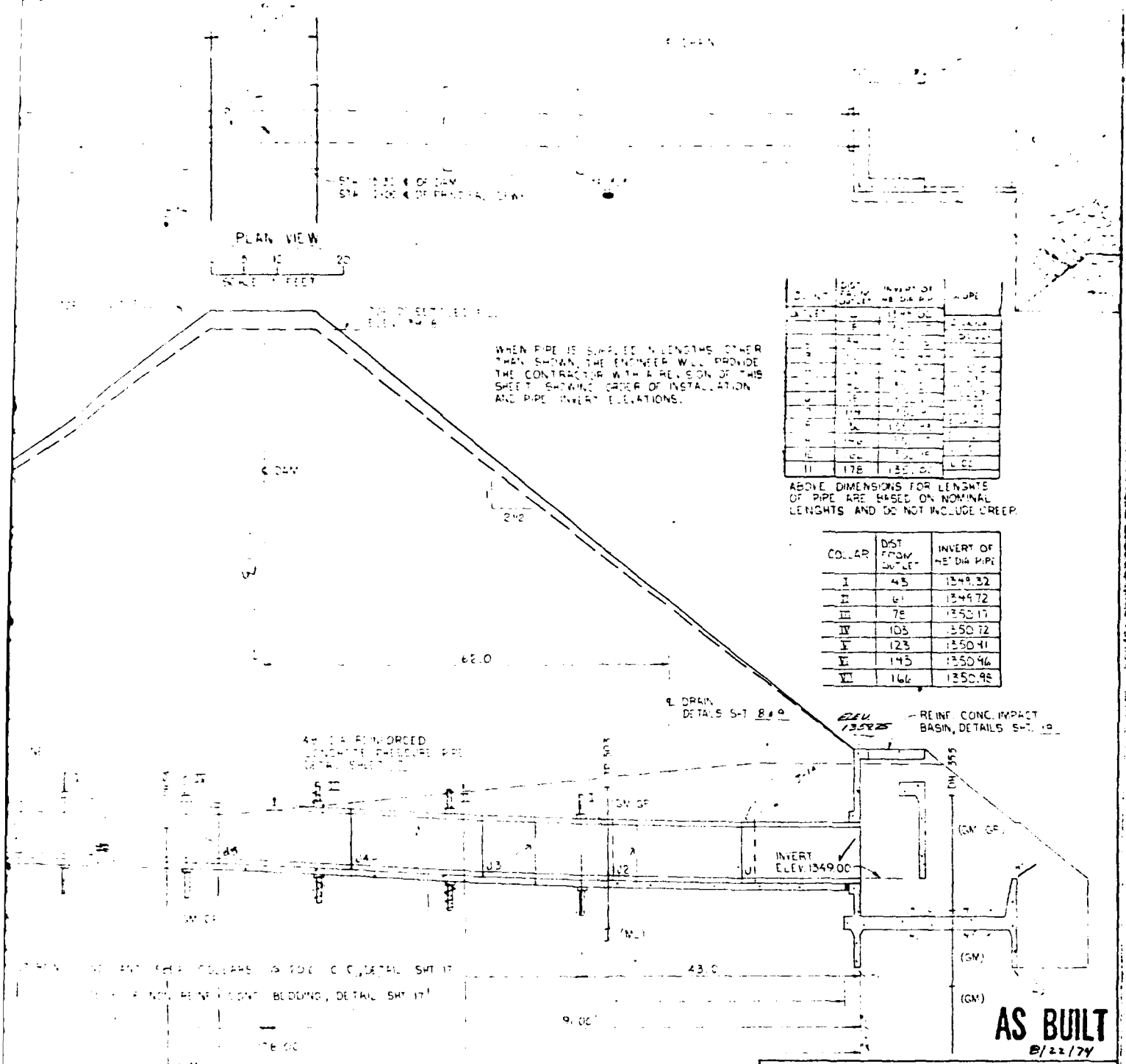
AS BUILT

8/22/79

PINE HOLLOW CREEK WATERSHED PROJECT
SITE 3A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
DRAINAGE SYSTEM
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

2


PLAN VIEW
REINF CONC RISER
DETAIL SHT
RISER CREST
ELEV 1381.0
ORIFICE CREST
ELEV 1366.6
ELEV 1365.6
18" DIA. REINFORCED
CONCRETE PRESSURE PIPE
DETAIL SHEET 18
RESERVOIR DRAIN
INLET ELEV. 1354.50
RESERVOIR DRAIN
INVERT ELEV. 1353.75
RISER FLOOR
ELEV 135
RESERVOIR DRAIN
CONC BEDDING
DETAIL SHT. 18
(GM GP)
(GW GP, SM SW)
(GM
(GM
(GW
PROFILE ALONG



COLLAR	DIST FROM OUTLET	INVERT OF 48" DIA PIPE
I	43	1349.32
II	61	1349.72
III	78	1350.17
IV	103	1350.72
V	123	1350.91
VI	145	1350.96
VII	166	1350.98

AS BUILT
8/22/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY NEW YORK
PLAN PROFILE OF PRINCIPAL SPILLWAY
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

J. TOENNIESSEN 9/71
D. J. ANGELO 9/71

NY-2161-P

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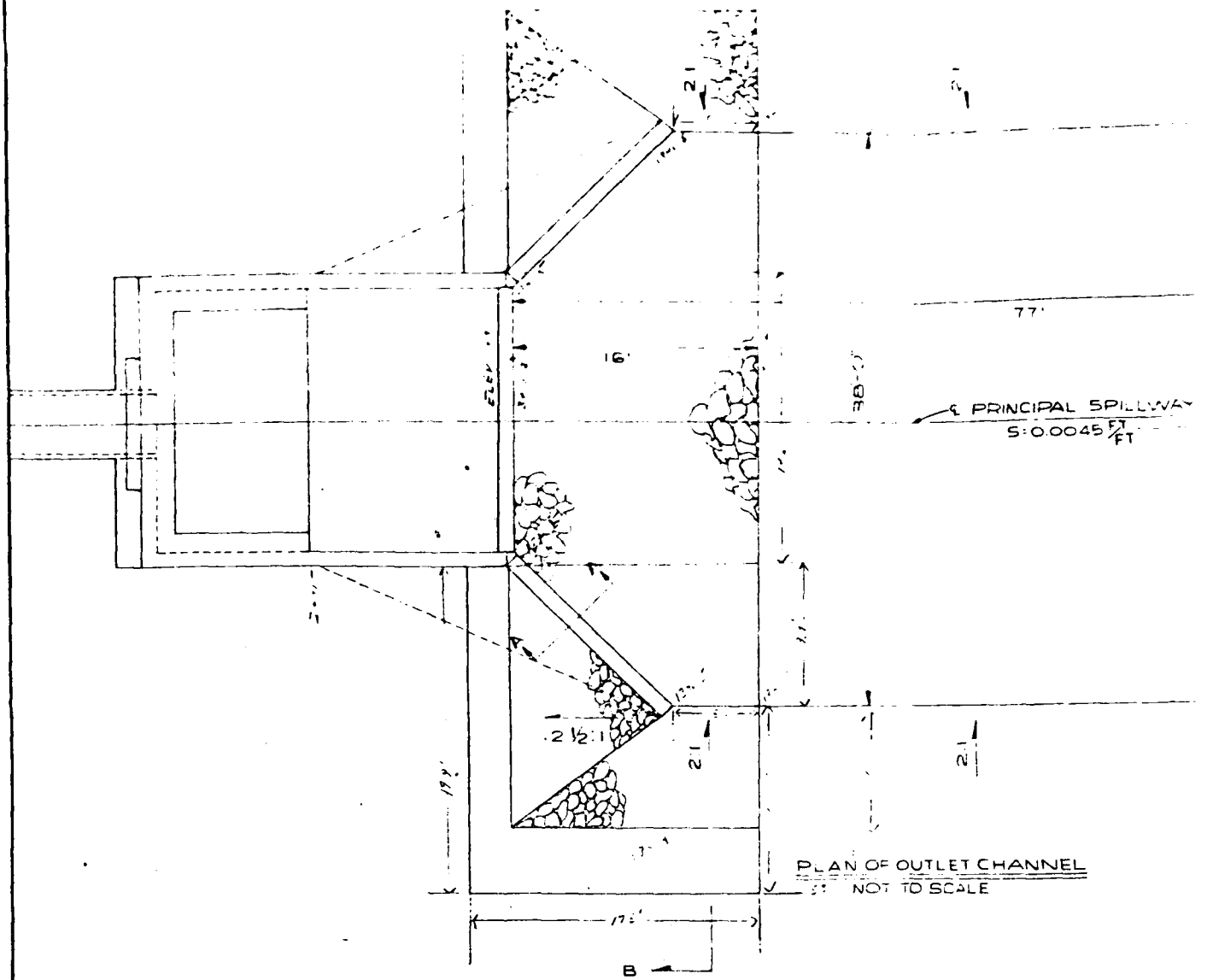
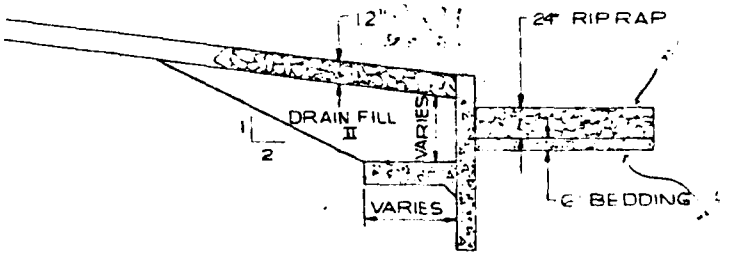
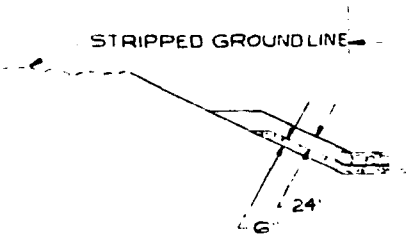
B-12



PLAN OF OUTLET CHANNEL
NOT TO SCALE



SECTION AA
NOT TO SCALE

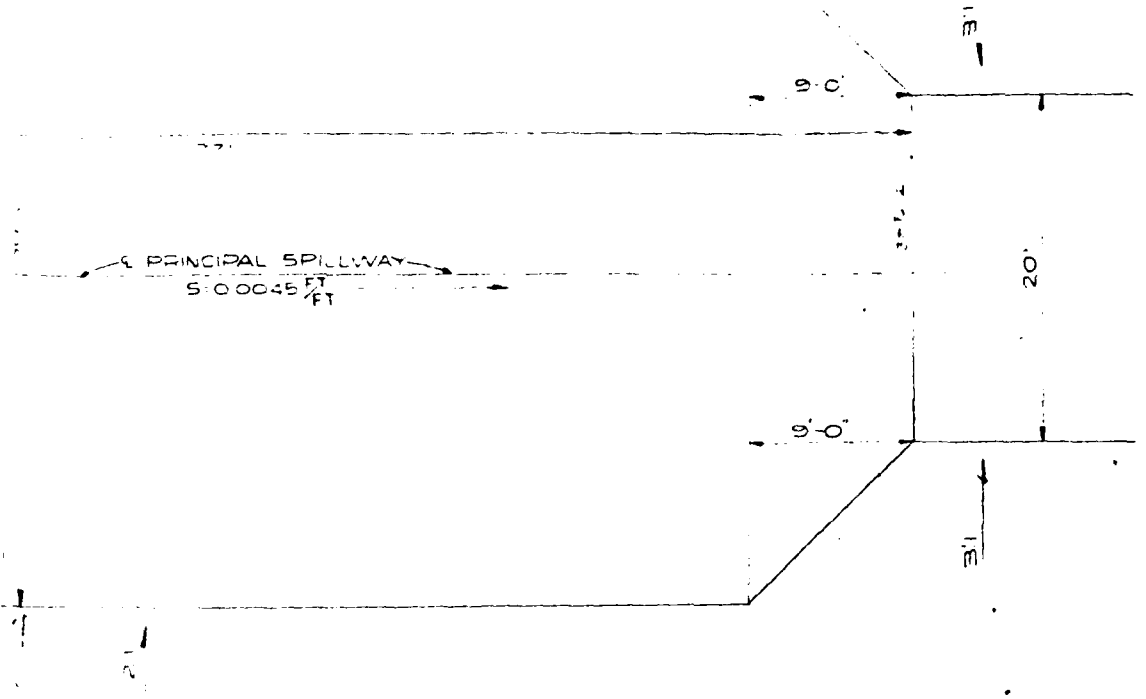


RIP RAP DETAILS

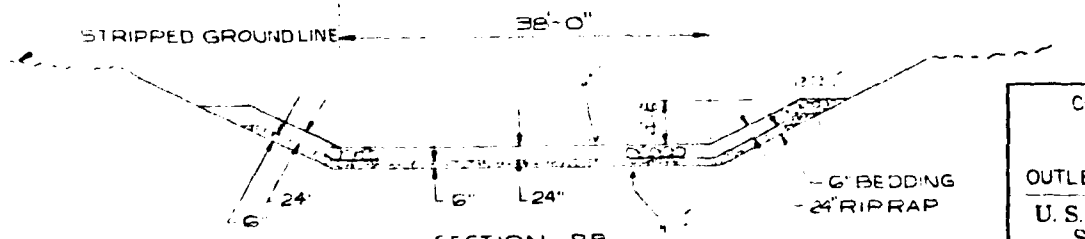
LOOSE ROCK RIP RAP SHALL BE GRADED FROM A MAXIMUM SIZE OF 24" TO A MINIMUM SIZE OF 6" A MAXIMUM OF 20% SHALL BE LESS THAN 6" (10 LB) A MAXIMUM OF 60% SHALL BE LESS THAN 12" (= 60 LB)

BEDDING DETAILS

BEDDING SHALL MEET THE GRADATION OF NYS DEPT OF TRANSPORTATION COARSE AGGREGATE #1



OF OUTLET CHANNEL
NOT TO SCALE



SECTION BB
NOT TO SCALE

2

8/22/74
AS BUILT

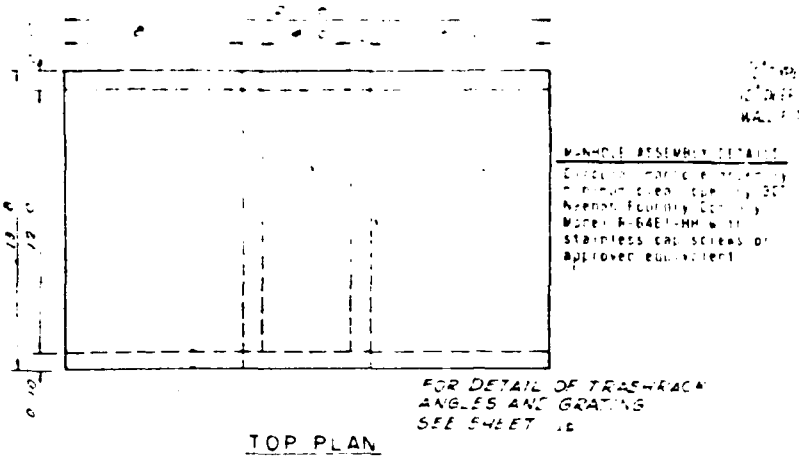
CONEWANGO CREEK WATERSHED
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
OUTLET CHANNEL AND RIPRAP DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

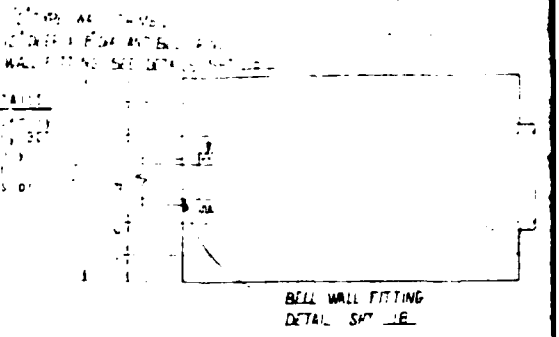
	Date
Designed J.D TOENNIESSEN	8-71
Drawn W. TURNER	8-71
Traced	
Checked	

Approved
Title
Date
Sheet No. 11
Drawing No. NY-2161-P

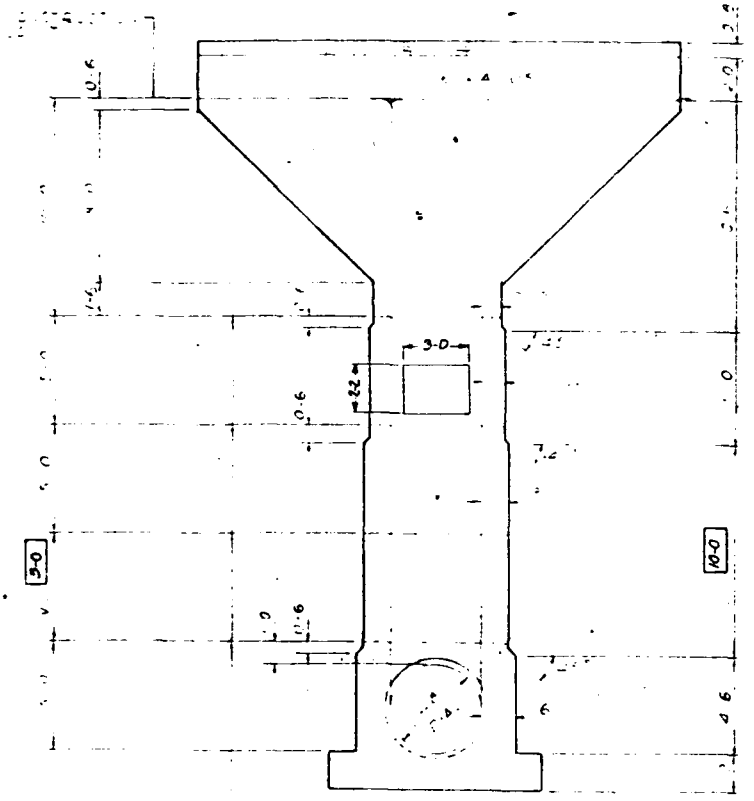
B-13



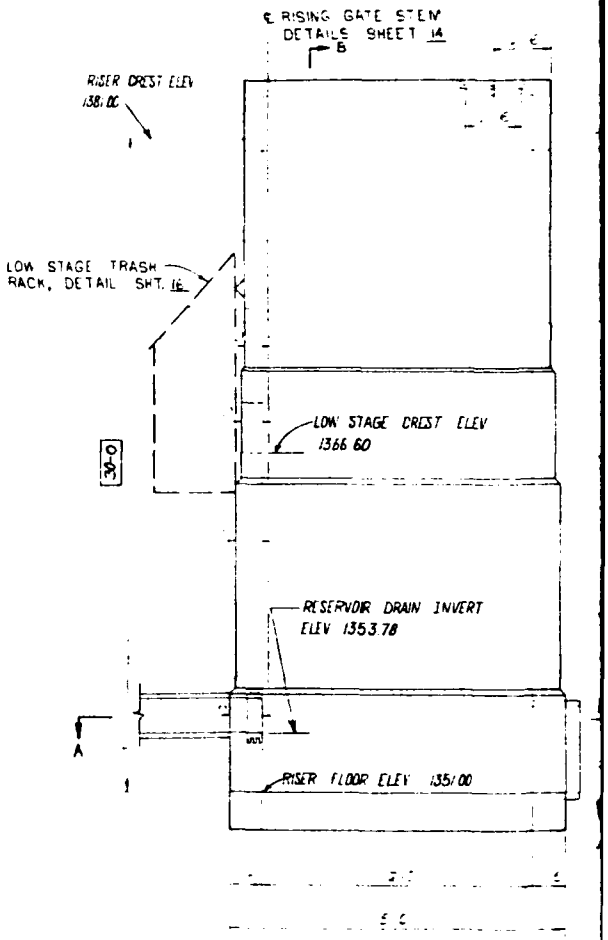
TOP PLAN



SECTION A-A



SECTION B-B

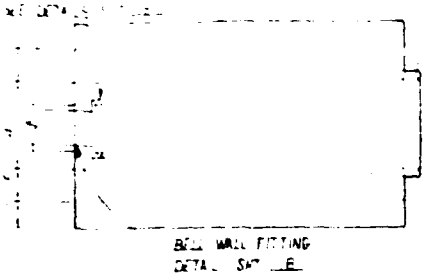


SIDEWALL ELEVATION

STANDARD COVERED RISER		
	f'_c = 4000 psi	f_c = 1600 psi
	n = 8	f_s = 20 000 psi
STANDARD DWG NO ES 3046 3053		
DATE 8-58	SHEET 1 OF 4	

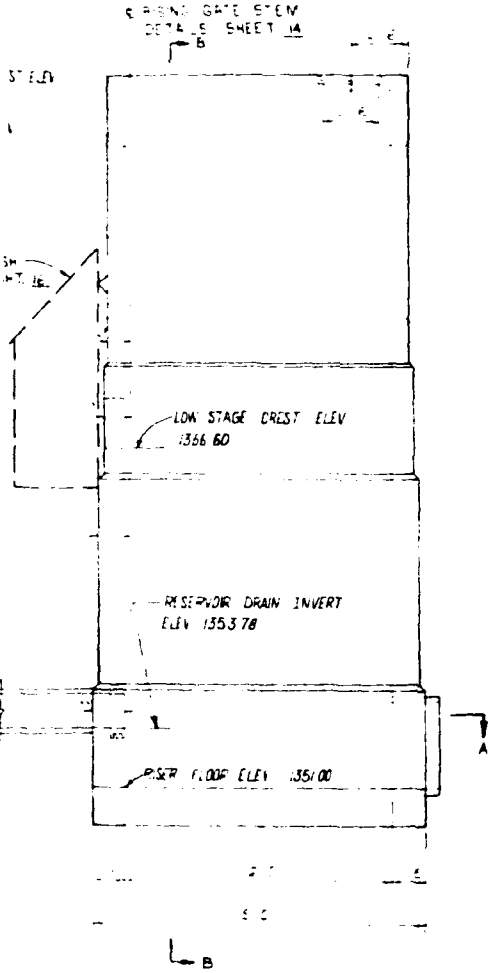
DRAFTED BY
LOEWER AND ASSOCIATES
ARCHITECTS & ENGINEERS
3720 FARRAGUT AVE KENSINGTON, MD

0 2 4 6
SCALE IN FEET



BELL WALL FITTING
DETAIL SHT E

SECTION A-A



SIDEWALL ELEVATION

STEEL SCHEDULE

MARK	SIZE	QUANTITY	LENGTH	TYPE	E	C	TOTAL LENGTH
T1	5	24	9-6	1	—	—	228-0
T2	5	6	12-3	1	—	—	56-6
T3	5	4	8-6	1	—	—	34-0
T4	5	4	7-3	1	—	—	29-0
T5	5	4	6-0	1	—	—	24-0
T6	5	4	4-9	1	—	—	18-0
T7	5	4	3-6	1	—	—	14-0
T8	5	4	14-0	19	2-9	11-3	56-0
T9	6	16	12-9	1	—	—	204-0
T10	5	8	12-9	1	—	—	102-0
T11	5	2	4-9	1	—	—	9-6
T12	5	2	5-9	1	—	—	11-6
T13	5	2	8-3	1	—	—	16-6
T14	5	2	10-9	1	—	—	21-6
T15	5	2	13-3	1	—	—	26-6
T16	5	2	15-9	1	—	—	31-6
T17	5	2	18-3	1	—	—	36-6
T18	5	2	20-9	1	—	—	41-6
T19	5	20	9-9	1	—	—	195-0
T20	5	10	12-3	1	—	—	122-6
T21	5	4	9-3	1	—	—	37-0
T22	5	4	8-0	1	—	—	32-0
T23	5	4	6-9	1	—	—	27-0
T24	5	4	5-6	1	—	—	22-0
T25	5	4	4-3	1	—	—	17-0
T26	5	4	3-0	1	—	—	12-0
T27	5	4	14-0	19	2-9	11-3	56-0
T28	6	32	11-3	21	3-7	7-6	360-0
T29	5	16	11-0	24	3-6	7-6	176-0
T30	5	2	6-3	1	—	—	12-6
T31	5	2	8-3	1	—	—	16-6
T32	5	2	11-3	1	—	—	22-6
T33	5	2	13-9	1	—	—	27-6
T34	5	2	16-3	1	—	—	32-6
T35	5	2	18-9	1	—	—	37-6
T36	5	2	21-3	1	—	—	42-6
T37	5	4	21-3	1	—	—	85-0
T38	5	4	21-3	1	—	—	85-0
T39	5	30	12-9	1	—	—	382-6
T40	6	5	9-3	1	—	—	46-3
T41	4	11	21-3	1	—	—	233-9
T42	4	4	9-3	1	—	—	37-0
T43	4	11	21-3	1	—	—	233-9
T44	4	4	9-3	1	—	—	37-0
T45	5	36	9-3	21	1-10	7-5	333-0
T46	5	2	11-6	21	1-11	9-7	23-0
T47	5	2	2-9	21	0-11	1-10	5-6

MARK	SIZE	QUANTITY	LENGTH	TYPE	E	C	TOTAL LENGTH
1	5	24	11-7				278-0
2	5	8	11-7				92-8
3	5	4	9-6				266-0
4	5	4	9-6				114-0
5	5	20	5-0				100-0
6	5	10	5-0				50-0
7	5	40	7-6	2	4-3	6-3	300-0
8	5	4	3-0				12-0
9	5	4	11-6				46-0
10	5	4	11-6				46-0
11	5	4	14-0				56-0
12	5	4	13-3				53-0
13	5	2	13-3				26-6
14	5	30	18-0				540-0
15	5	4	11-6				46-0
16	5	20	14-0	2	3-6	7-6	280-0
17	5	2	51-0				102-0
18	5	4	11-0				44-0
19	5	4	11-4	2	3-6	7-6	45-4

20
10
40

8/22/74 AS BUILT

QUANTITIES

STEEL [illegible] 3186-0 3323 [illegible] LBS
[illegible] LBS
[illegible] LBS
[illegible] LBS
[illegible] LBS
15482.0 LBS

CONCRETE [illegible] 69.0 CU. YDS.

LENGTH OF [illegible] EQUALS (3541) + LENGTH OF BARS 6 THROUGH 47

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
RISER STRUCTURAL DETAILS

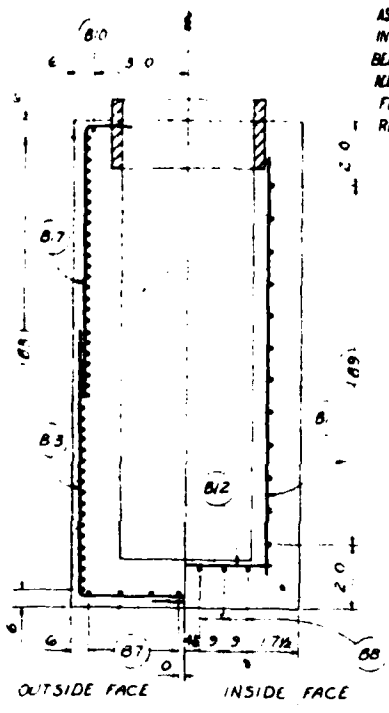
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed	J TOENNIESSEN	7/71
Drawn	R G YOLTON	7/71
Traced		
Checked		

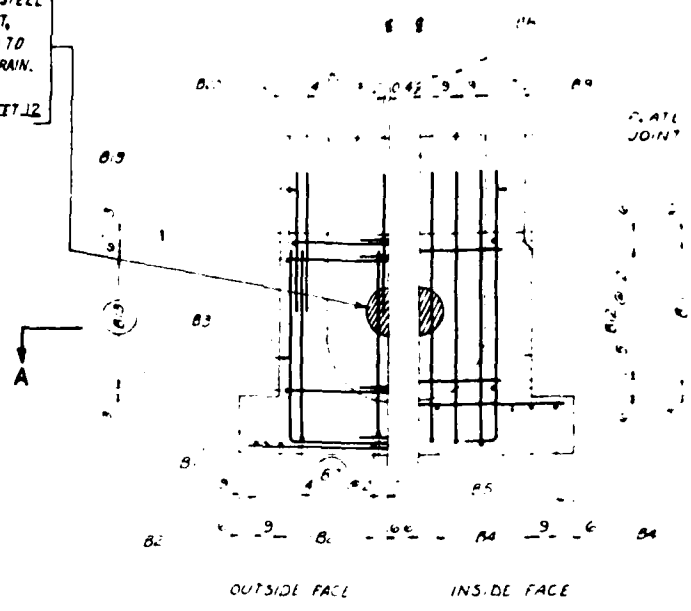
NY-2.61-P

B-14

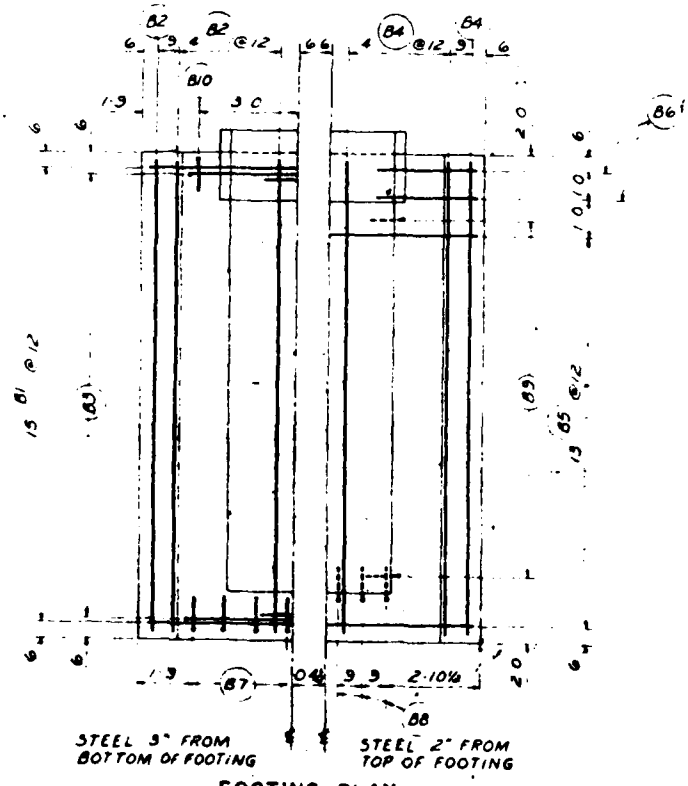
AS DIRECTED BY ENGINEER, STEEL IN SHADED AREA WILL BE CUT, BENT OR MOVED AS REQUIRED TO ACCOMMODATE RESERVOIR DRAIN. FOR EXACT LOCATION OF RESERVOIR DRAIN SEE SHEET 12



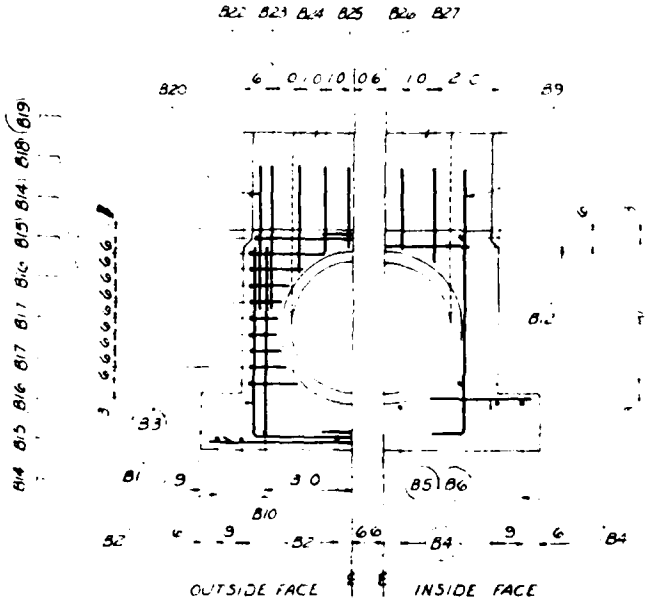
SECTION A-A



UPSTREAM ELEVATION



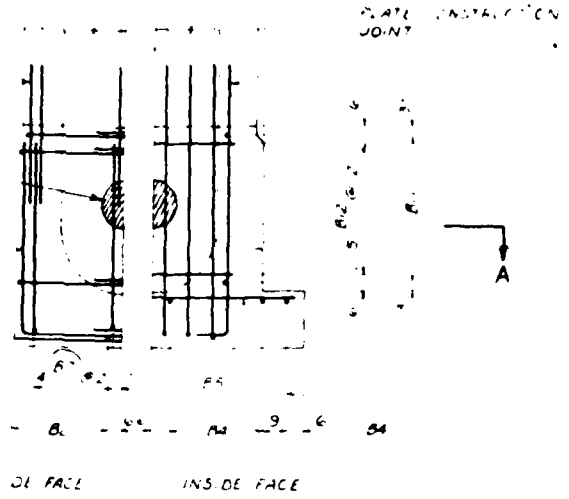
FOOTING PLAN



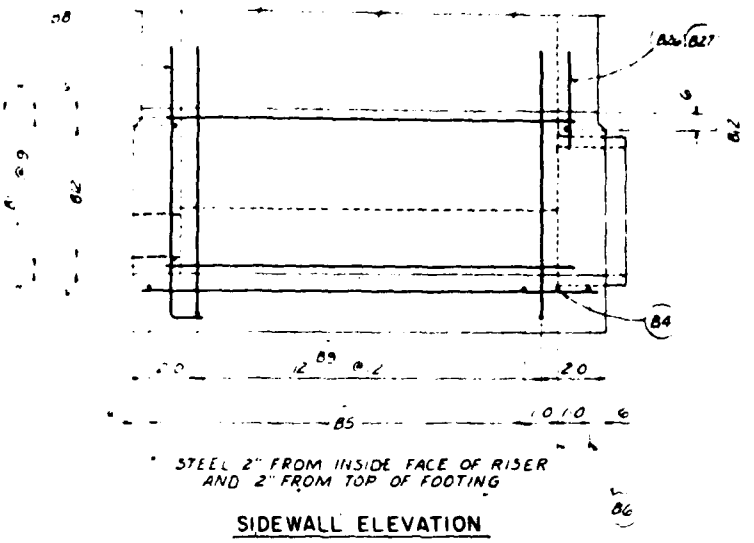
DOWNSTREAM ELEVATION

STANDARD COVERED RISER	
DESIGN CONSTANTS f'_c = 4000 psi, n = 8	f_c = 1600 psi, f_s = 20,000 psi
STANDARD DWG. NO. ES 3048-3015E	
DATE 8-68	SHEET 2 OF 4

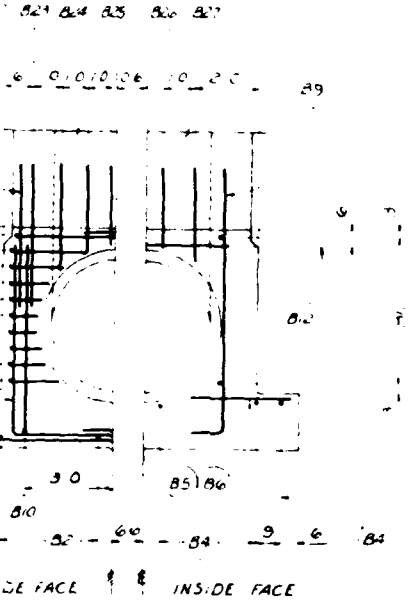
0 2' 4 6
SCALE IN FEET



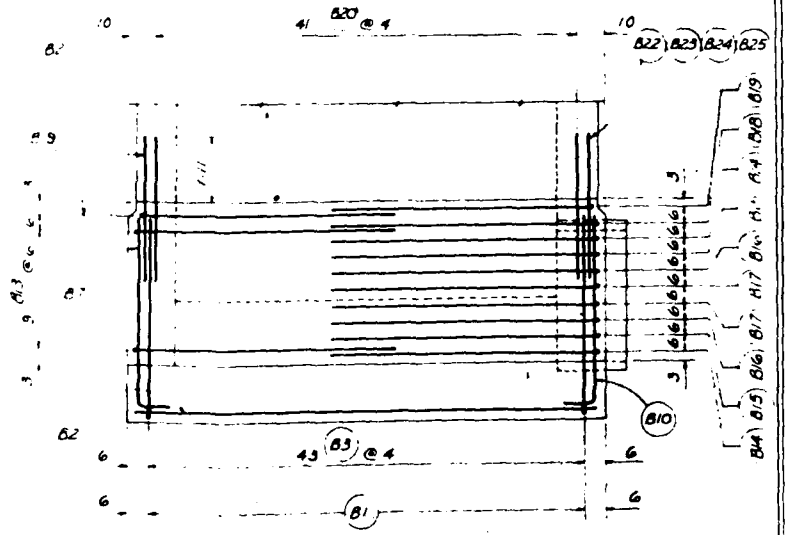
UPSTREAM ELEVATION



SIDEWALL ELEVATION



DOWNSTREAM ELEVATION



SIDEWALL ELEVATION

AS BUILT
8/22/74

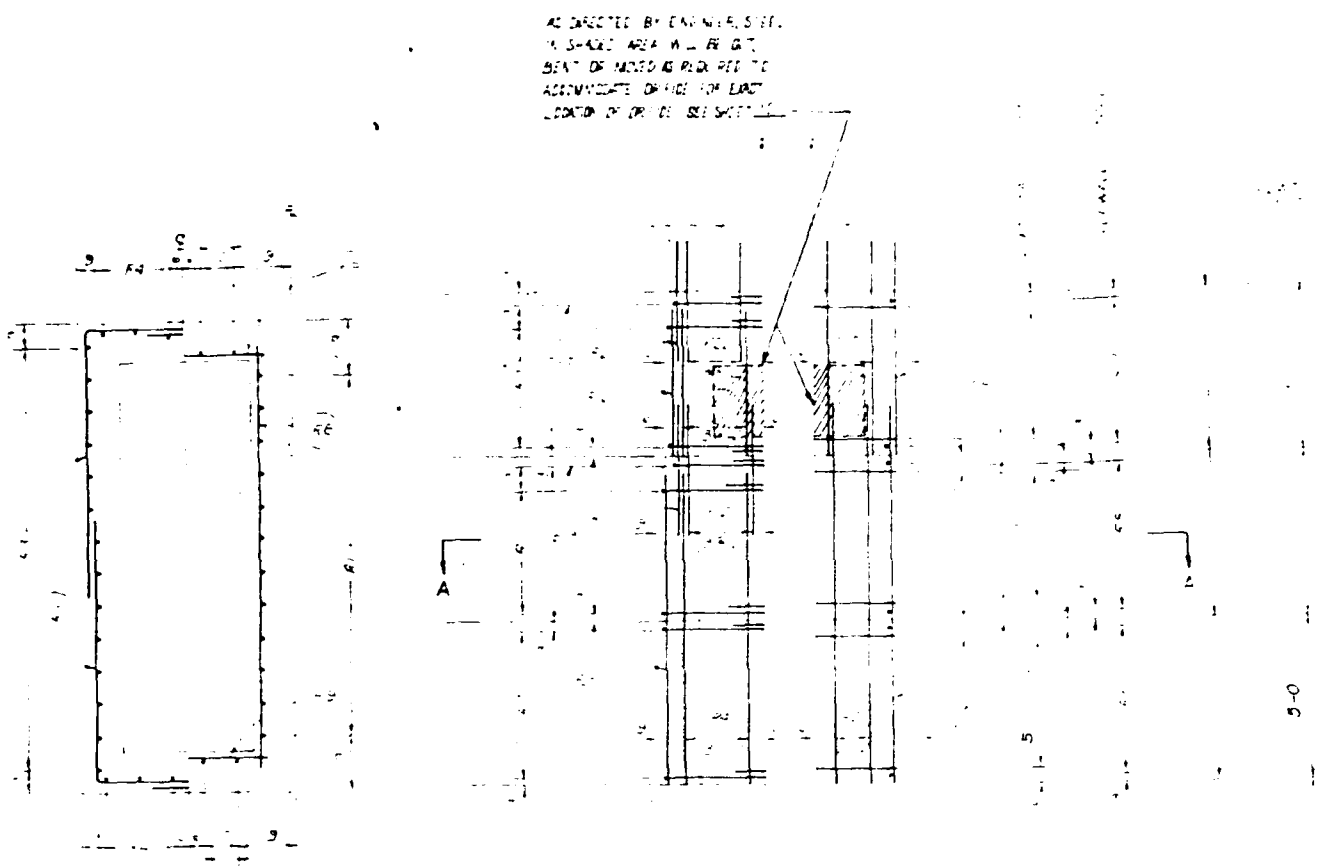
CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTUAQUA COUNTY, NEW YORK
RISER STRUCTURAL DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Date
Adapted J. Tennessen 5/21
Drawn
Traced
Checked
Approved by
Title
Drawing No. NY-2161-P
Sheet No. 13 of 54

2

B-15



SECTION A-A

OTHER SECTIONS SIMILAR

ENDWALL ELEVATION

CONSTR. JOINT

CONSTRUCTION DETAILS

1. SPECIFIED BAR DIMENSIONS ARE MEASURED TO OUTSIDE EDGE OF ALL BENDS.
2. RADIUS OF BENDS EQUALS 3 BAR DIAMETERS FOR SIZES EQUALS TO OR LESS THAN #7
3. THE 2" AND 3" DISTANCE FROM SPECIFIED CONCRETE SURFACE ARE CLEAR DISTANCES. WHERE NOT OTHERWISE SPECIFIED ALL REINFORCING STEEL PLACED IN CONCRETE POURED AGAINST THE GROUND SHALL HAVE A MINIMUM OF 3" COVER. ALL REINFORCING STEEL PLACED IN CONCRETE POURED IN FORMS SHALL HAVE A MINIMUM OF 2" CLEAR COVER.
4. ALL EXPOSED EDGES OF CONCRETE TO HAVE A 3/4" CHAMFER UNLESS OTHERWISE NOTED.

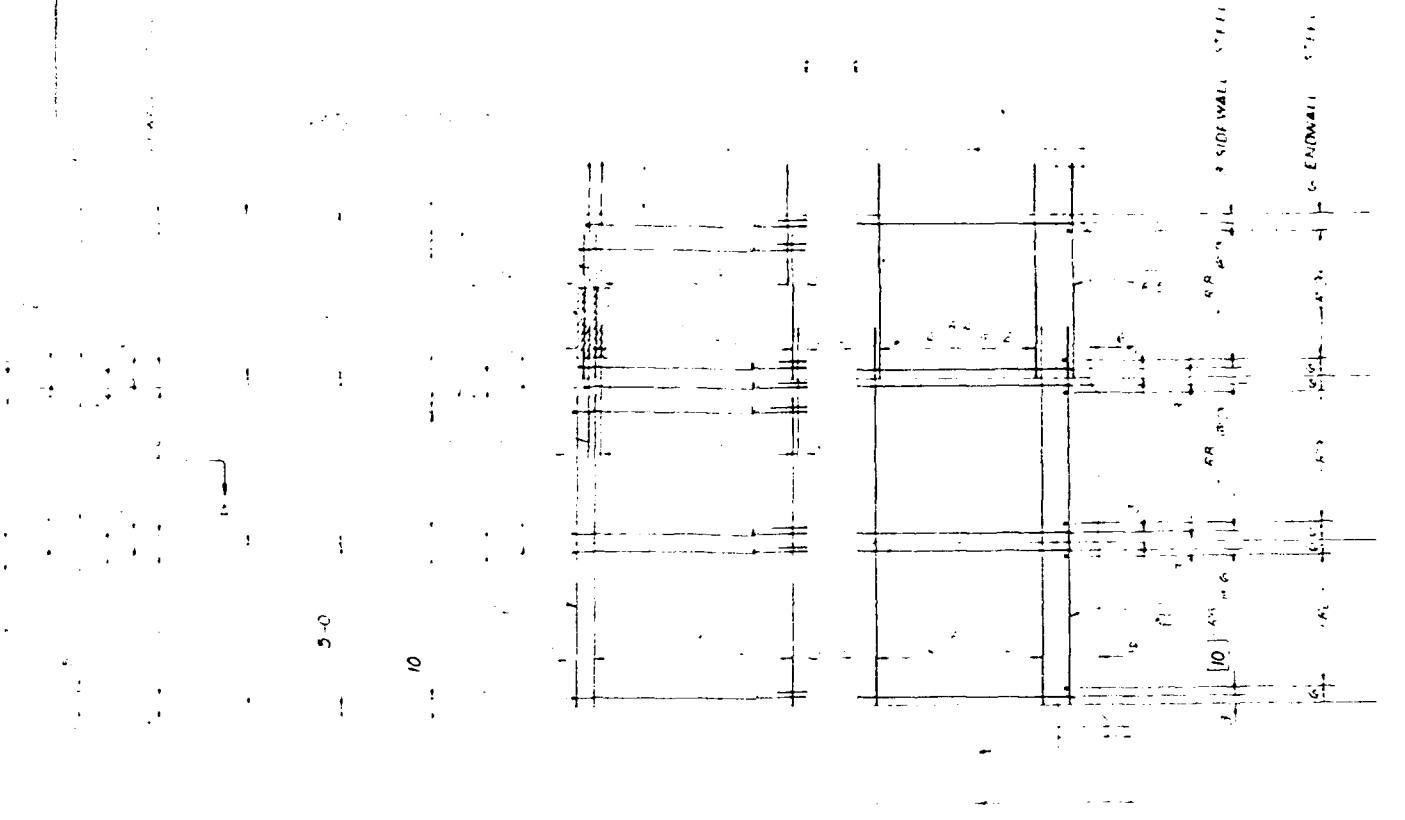
SLIDE GATE DETAILS

1. 18" DIA FLAT FRAME SLIDE GATE
2. CLASS O-30
3. SLIDE GATE SHALL CONFORM TO SPECIFICATIONS AND SHALL BE TYPE MHS-1.
4. 2" TYPE WALL THIMBLE 10" DEEP.
5. RISING STEM, STEM GUIDES, AND LIFTING DEVICE SHALL BE SIZED, AND SPACED ACCORDING TO MANUFACTURER'S RECOMMENDATIONS

STANDARD CORRUGATED PIPE

SCALE IN FEET

PLA
CONSTR



SIDEWALL ELEVATION

CONSTR. JOINT

Continuous face construction joint
Splices shall be either
Butt welded
Lapped 3" one edge
Lapped 3" one or both edges

TAILS

TE

SPECIFICATIONS SHALL BE TYPE M-ES-1.
E P.
S AND LIFTING DEVICE SHALL BE
NG TO MANUFACTURER'S RECOMMENDATIONS.

PLATE
CONSTR. JOINT

2

AS BUILT
8/22/74

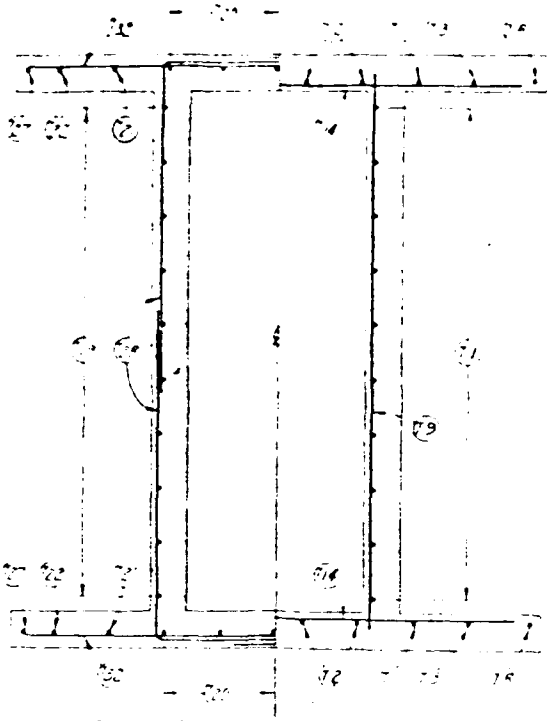
CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
RISER STRUCTURAL DETAILS

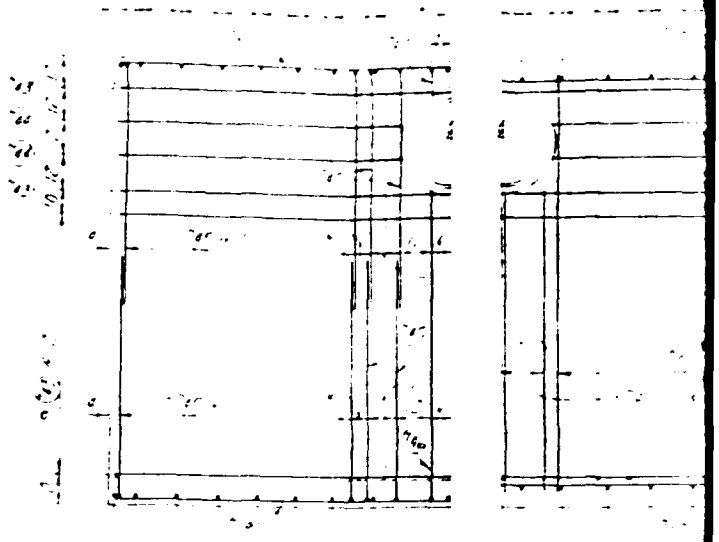
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

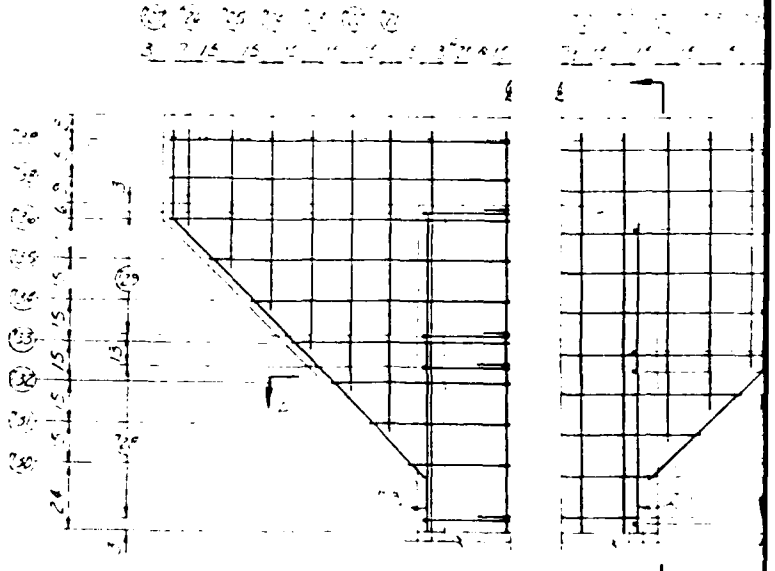
Adapted J TOENNIESSEN 7/71
R G YOUNG 7/71

NY-216I-P

B-16

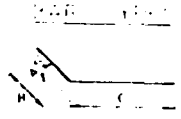






STANDARD COVERED RISER	
DESIGN CONSTANTS	f'_c = 4000 psi f_c = 1800 psi n = 8 f_s = 24,000 psi
STANDARD DRG NO	ES 3045 3015E
DATE	SHEET 4 OF 4

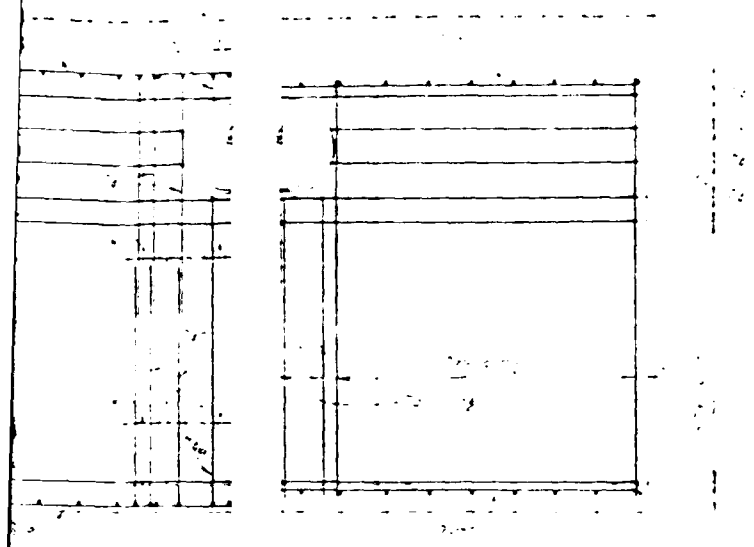
TYPE 1

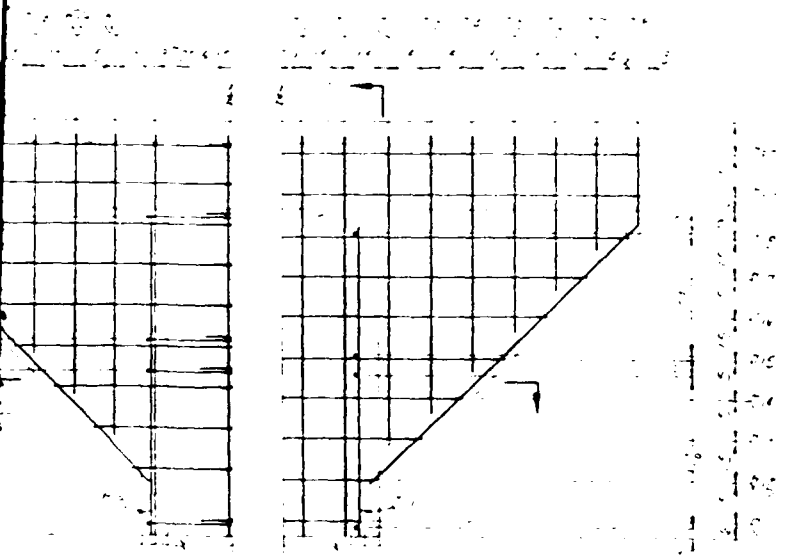


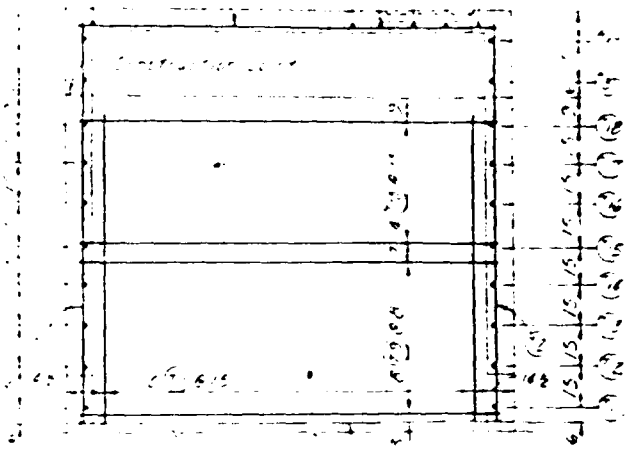
TYPE 2

TYPE 3

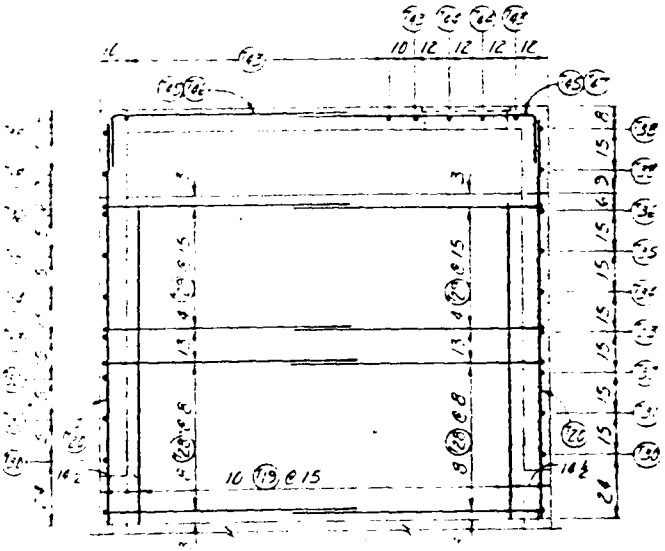
Note







Steel 2" From Inside Face



Steel 2" From Outside Face

AS BUILT

Scale in Feet
Unless Otherwise Shown 8/24/79

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
RISER STRUCTURAL DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

NY-2.9-P

B-17

LOW STAGE TRASH RACK BILL OF MATERIALS

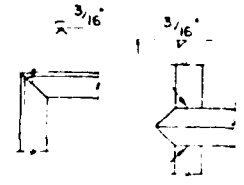
ITEM	SIZE	LENGTH	QUANTITY
Angle (A)	3" x 3" x 1/4"	1' - 0"	2
Angle (B)	"	4' - 0"	2
Angle (C)	"	7' - 6"	2
Angle (D)	"	5' - 7 3/8"	2
Angle (E)	"	4' - 8"	2
Angle (F)	"	5' - 2 1/2"	2
Angle (G)	"	5' - 5 3/8"	4
Angle (H)	"	4' - 2 1/16"	8
Angle (J)	"	6' - 2 3/8"	2
Angle (K)	"	3' - 1"	2
Angle (L)	"	1' - 9"	2
Hook Bolts	5/8" Dia	2' - 1' - 8"	4
Pipe Sleeves	3/4" Dia	1' - 3"	2
Pipe Sleeves	3/4" Dia	0' - 10"	2
Angle (M)	4" x 4" x 1/4"	5' - 8"	1

CONSTRUCTION DETAILS

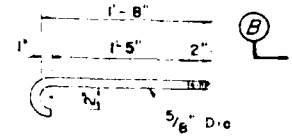
All points of contact between angles to be welded.

2 Low stage trash rack to be galvanized in accordance with Spec 582 if necessary for galvanizing trash rack may be fabricated in section and bolted with the approval of the Engineer.

3 Material in low stage trash rack shall conform to Spec 58 for structural steel

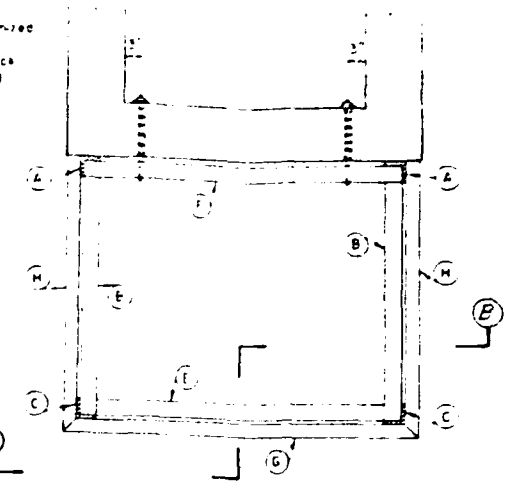


WELDING DETAILS

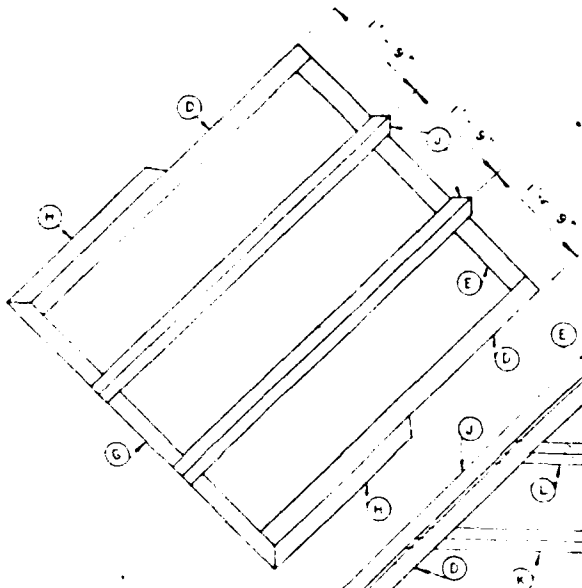


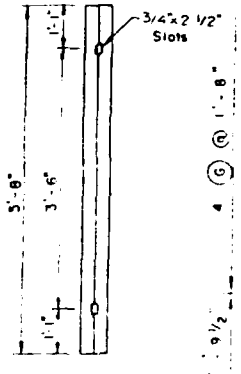
"HOOK" BOLT

supply with washer and Type 2 nut

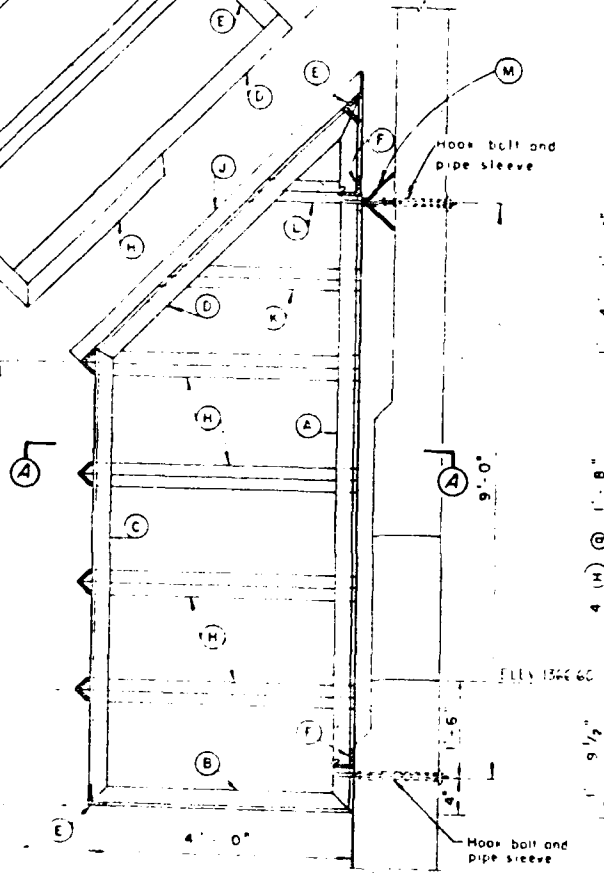


SECTION A A

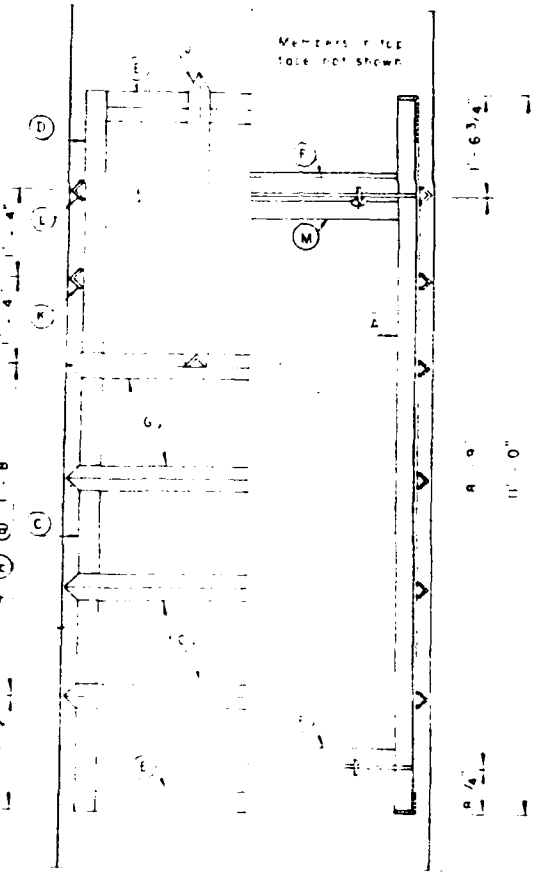




ANGLE (M)



SECTION ON ℄

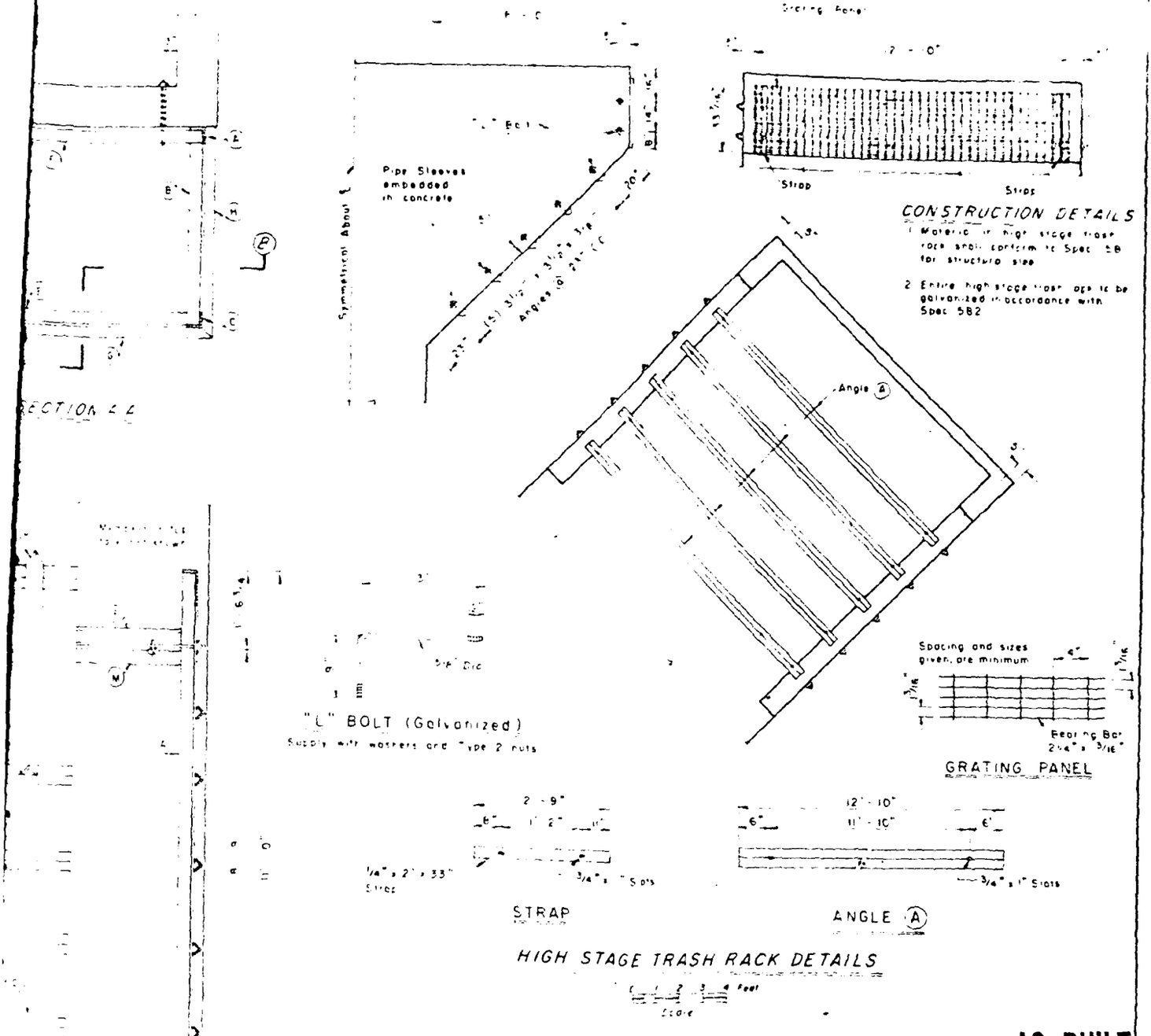


SECTION B B

0 1 2 3 4 FEET

SCALE

LOW STAGE TRASH RACK DETAILS



CONSTRUCTION DETAILS

1 Material in high stage trash rack shall conform to Spec 58 for structural steel

2 Entire high stage trash rack to be galvanized in accordance with Spec 582

GRATING PANEL

STRAP

ANGLE (A)

HIGH STAGE TRASH RACK DETAILS

Scale

AS BUILT
8/22/74

HIGH STAGE TRASH RACK BILL OF MATERIALS

ITEM	SIZE	LENGTH	QUANTITY
Angles A			10
Strap			4
L Bolt			28
Bearing Bar			2
Pipe Sleeves			28

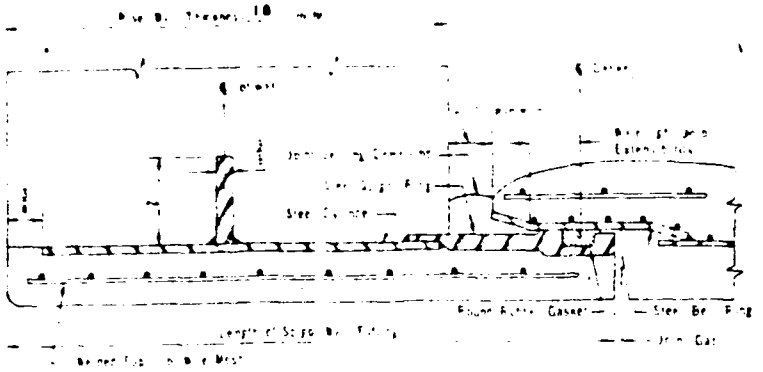
CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
RISER TRASH RACKS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

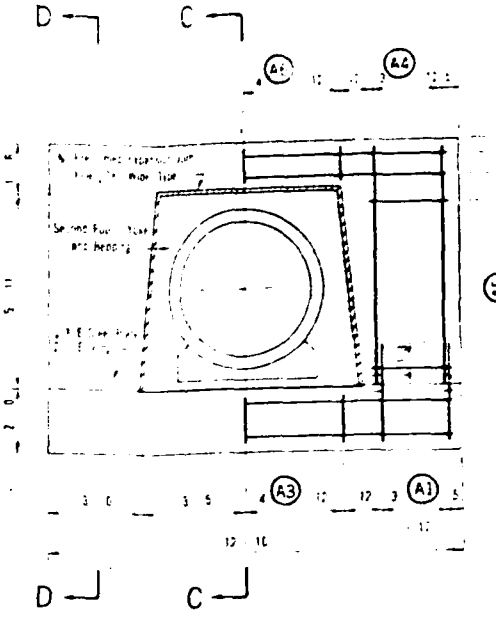
Date
Adopted J. TOENNIESSEN 11/71

NY-216-P

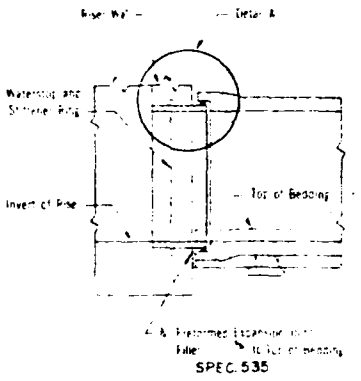
B-18



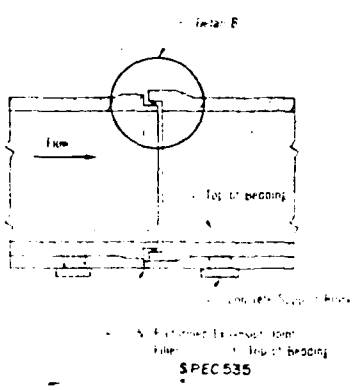
DETAIL A



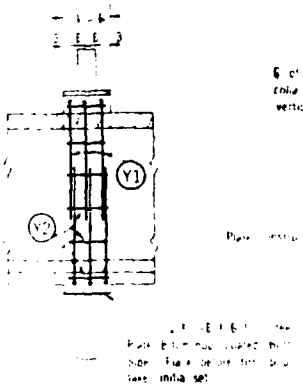
DETAIL OF ANTI-SEEP COLLAR 7



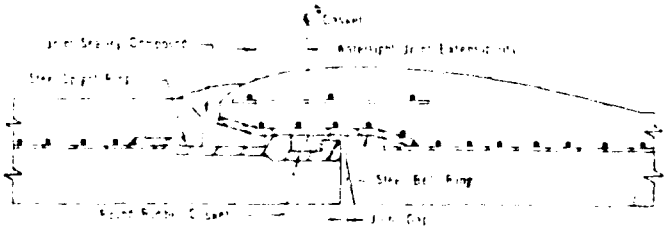
DETAIL OF SPIGOT WALL FITTING



DETAIL OF PIPE JOINT



SECTION C-C



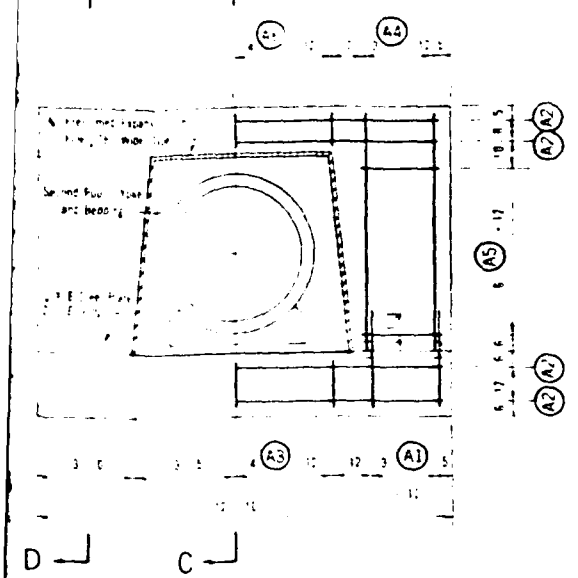
DETAIL B

# OF PIPE SECTIONS			
EACH			
B	20.0	2 3/4	0.050 2°53'
1	18.0	2 3/4	0.050 2°53'

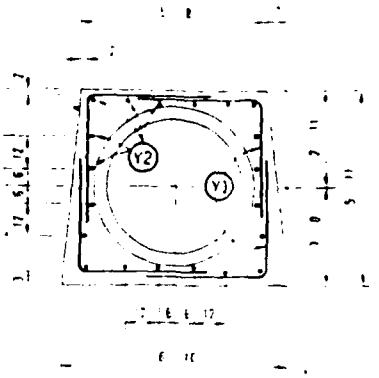
JOINT REQUIREMENTS

SUPPLY ONE SPIGOT RING WALL FITTING FOR 18" WALL CAST OUTSIDE OF SPIGOT RING WITH CONCRETE ON 18 SECTION

STANDARD CONDUIT DETAILS
FOR REINFORCED CONCRETE PRESSURE PIPE PRINCIPAL SPILLWAY
STANDARD DRG NO ES-5048-BE
DATE 2-70 SHEET 1 OF 1



DETAIL OF ANTI-SEEP COLLAR 7 REQUIRED



DETAIL OF ANTI-SEEP COLLAR YOKE

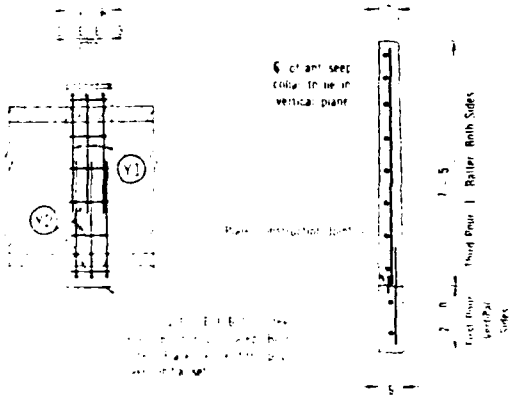
STEEL SCHEDULE

Mark	Size	Quantity Per Collar	Length	Type	Total Quantity	Total Length
A1	4	6	3	6	42	126-0
A2	4	4	12	4	28	336-0
A3	4	7		6	49	73-6
A4	4	6		7	42	30-0
A5	4	12	2	6	84	210-0
A6	4		2	6	49	49-0
Y1	4	12	6	10	84	574-0
Y2	4	20	7	10	140	163-4

QUANTITIES

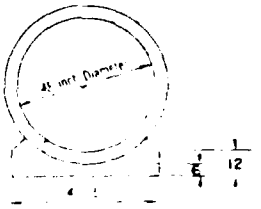
Concrete	Cu Yds
Anti-seep Collar including Yoke	
Total Reading	22.0 cu YDS
Total	21.2 cu YDS
Steel	Pounds
Anti-seep Collar including Yoke 1842-2	1231
	57.48

Concrete quantities are based on an outside diameter of [illegible] inches

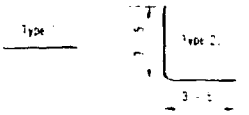


SECTION C-C

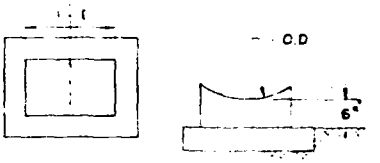
SECTION D-D



DETAIL OF BEDDING



BAR TYPES



Plan Front Elevation

SUGGESTED SUPPORT BLOCKS

Suitable blocks shall be provided to support the pipe to the required line and grade. The contractor shall furnish the necessary concrete required. Payment will be made at the unit price

8/22/74

AS BUILT

JOINT REQUIREMENTS

200	2	0.050	2°53'
18.0	2	0.050	2°53'

SPIGOT END WALL FITTINGS FOR 18" WALL
SIDE OF SPIGOT RING IN CONCRETE ON 18 SECTION

STRENGTH REQUIREMENTS

Size of Pipe	Minimum Pressure	Minimum Edge Bearing Strength at Release of Lateral Equal to Size	
		ASTM C 361	ASTM C 361
	Head of Water	Load to produce 0.001 inch crack one foot long	Load to produce 0.01 inch crack one foot long
inches	feet		
48	35.4	15,114	

The inside diameter of pipe is 57.48 inches. The pipe is designed for a maximum allowable fill of 35.4 feet of water. The pipe must be installed in accordance with the strength requirements of the pipe furnished to the [illegible]

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
48" DIA. CONDUIT DETAILS

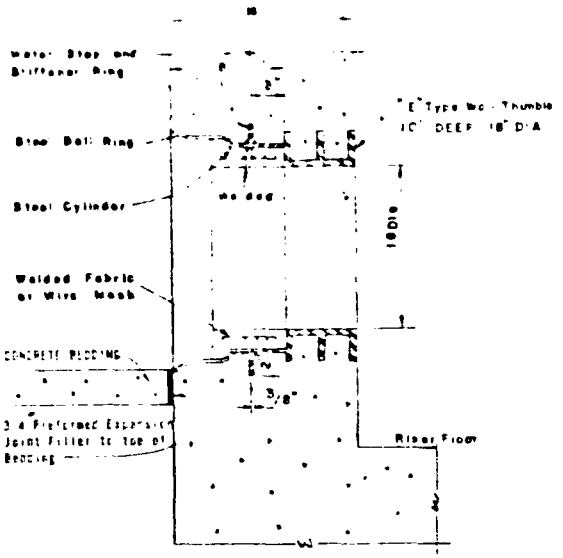
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

		Date
Designed	J.D. TOFANIESSEN	8-71
Drawn	W.M. TURNER	8-71
Traced		
Checked		

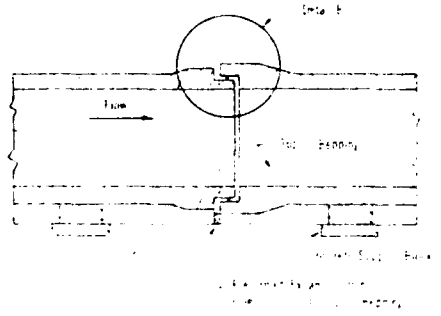
Approved by
Title
Date
File No. NY-216-P

2

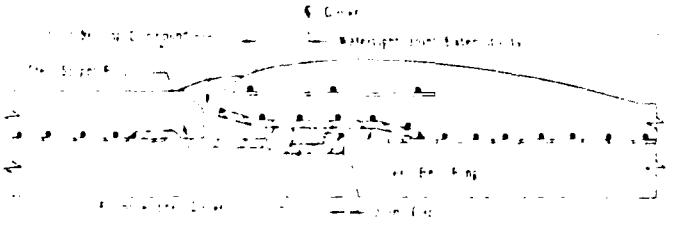
B-19



BELL WALL FITTING
W/ "E" TYPE WALL THIMBLE



DETAIL OF PIPE JOINT



DETAIL B

No. of PIPE SECTIONS EACH	JOINT REQUIREMENTS			
2	20.0	3 3/4"	.00960	5°30'

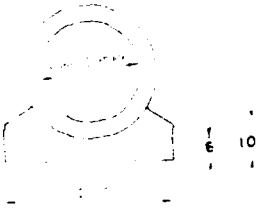
STANDARD CONDUIT DETAILS
FOR
REINFORCED CONCRETE PRESSURE PIPE
PRINCIPAL SPILLWAY

STANDARD DWG NO. ES 501B-BE

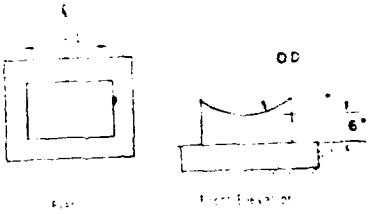
DATE 2-70 | SHEET 1 OF 1

QUANTITIES (THIS SHEET ONLY)

CONCRETE 2.4 Cu Yds
(NON-REINF.)



DETAIL OF BEDDING



SUGGESTED SUPPORT BLOCKS

STRENGTH REQUIREMENTS

IT REQUIREMENTS

2 3/4			
180	34.2	4712	
			240

8/24/79
AS BUILT

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
RESERVOIR DRAIN CONDUIT DETAILS

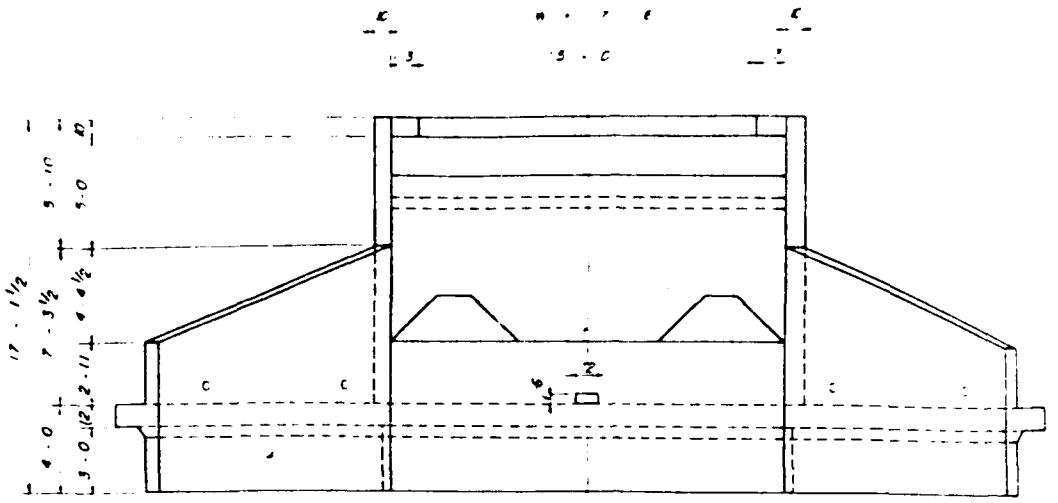
U S DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

JULIUS D. TOENNIESSEN 9-71
WILLIAM TURNER 9-71

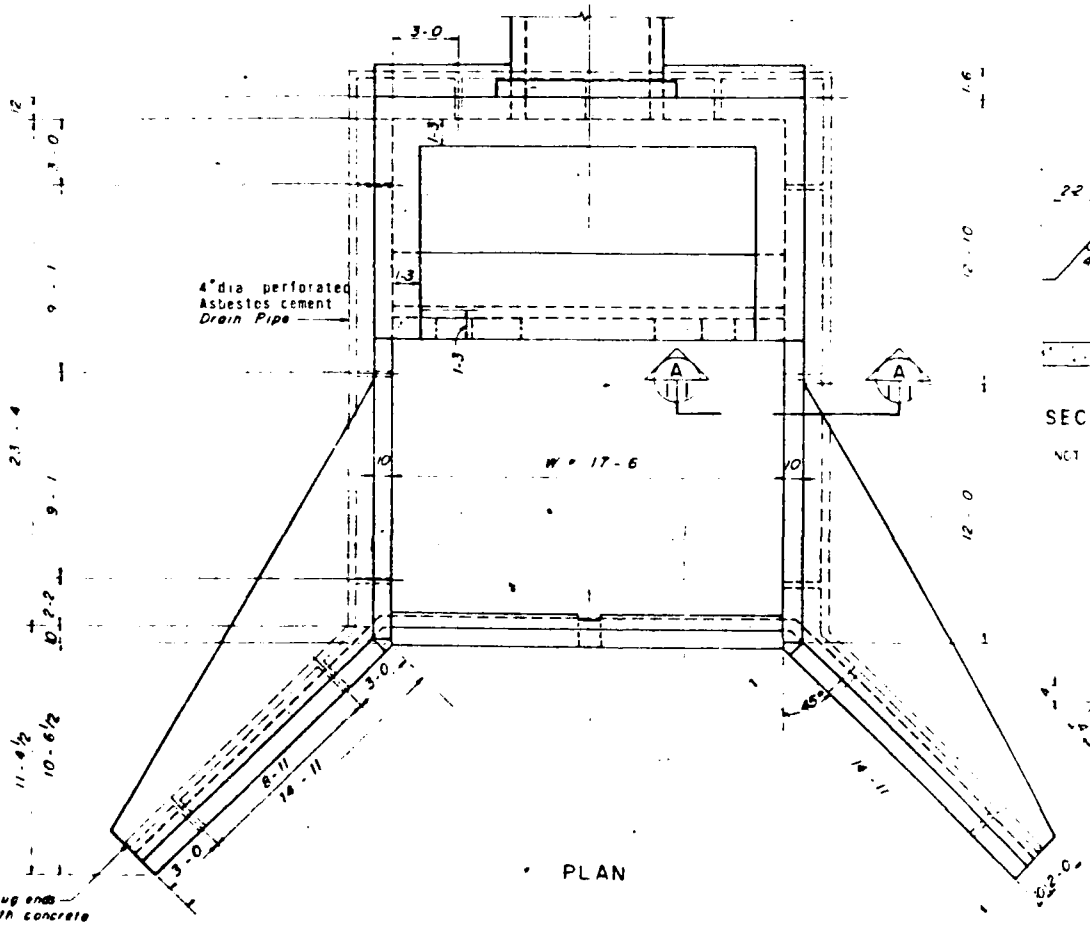
NY-216-P

3y B-20

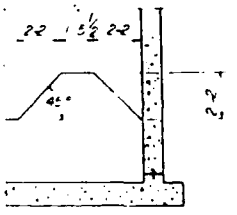
2



DOWNSTREAM ELEVATION

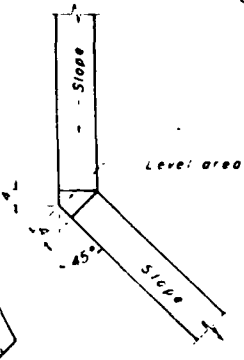


PLAN



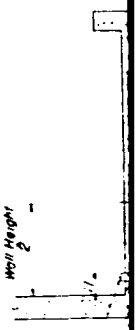
SECTION A

NOT TO SCALE



PLAN - JUNCTION SIDEWALL AND WINGWALL

NOT TO SCALE



SECTION THR

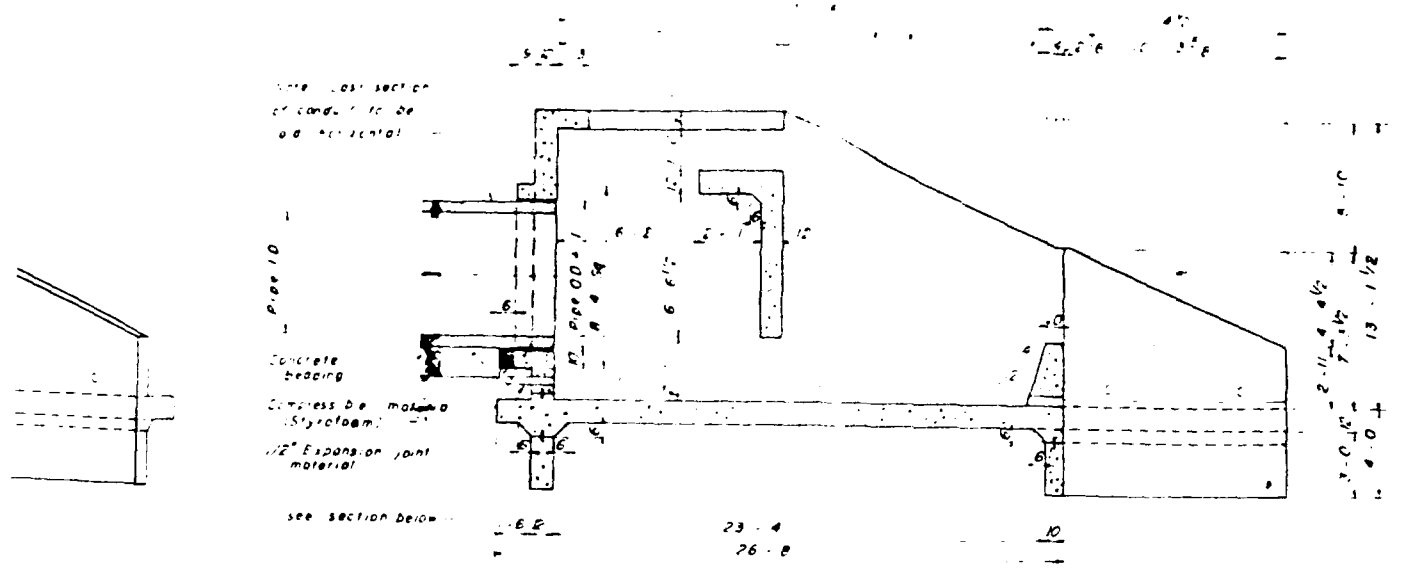
NOT

CUTOFF WALL

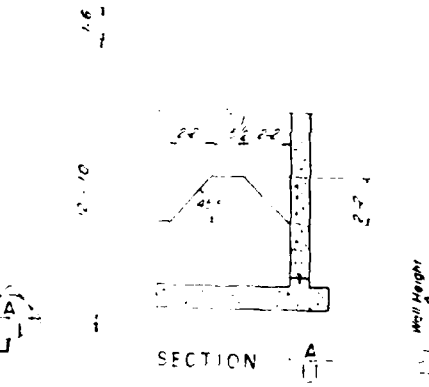
STANDARD IMPACT BASIN	
DESIGN CONSTANTS f'_c = 4000ps f_c = 1600psi n = 8 f_s = 20,000psi	CARL ROHDE Consulting Engineer 654 Pidgeway Rd Lake Oswego Ore
STANDARD DRAWING NO ES-4175	
DATE 1-70 SHEET 1 OF 5	

1 0 5 10

SCALE IN FEET
EXCEPT AS NOTED



SECTION ON CENTERLINE



SECTION A-A

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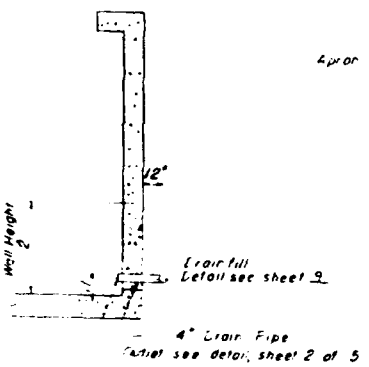
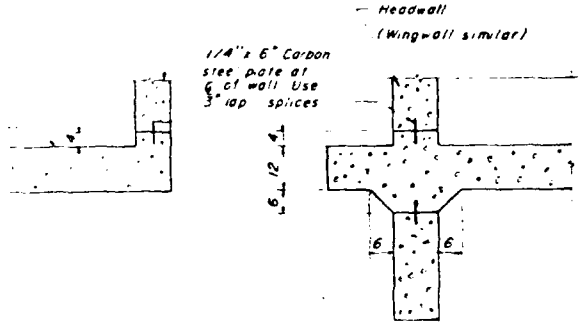


SECTION THROUGH DRAIN & FILTER

NOT TO SCALE



CONSTRUCTION JOINT DETAILS

NOT TO SCALE

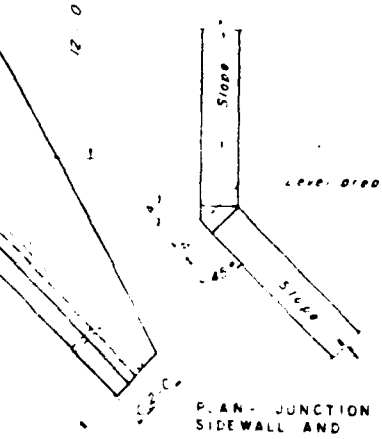
NOTE

Perforated drain pipe shall conform to specification 545 and shall be 4" dia pressure pipe, class 200

QUANTITIES

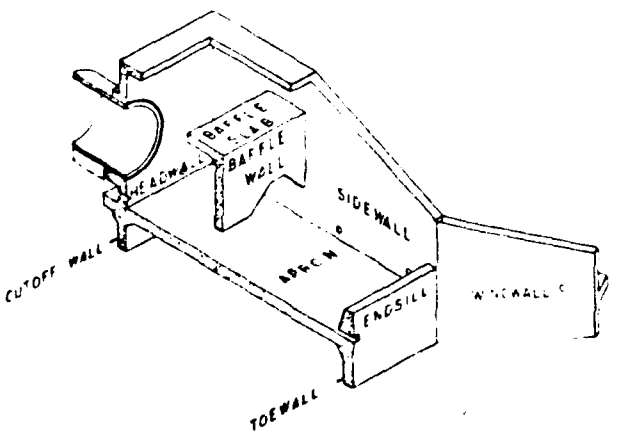
Formwork (Contact area)	3080	Sq Ft
Reinforced Concrete (Class 4000)	77	Cu Yds
Reinforcing Steel	14,100	lbs
Drainage		
4" Perforated drain pipe	137	Lin Ft
Animal screen detail, sheet 2 of 5	13	ea
Drain pipe tees	13	ea
Drain pipe 90° ells	2	ea
Drain pipe 45° ells	2	ea
Joints 1/4" x 6" Carbon stee plate Structural grade	985	lbs

8/22/79 AS BUILT



PLAN - JUNCTION SIDEWALL AND WINGWALL

NOT TO SCALE



ISOMETRIC VIEW

SCALE IN FEET EXCEPT AS NOTED

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
IMPACT BASIN DETAILS

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed W. TOENNIESSEN 11/72 Date

Approved by

Drawn

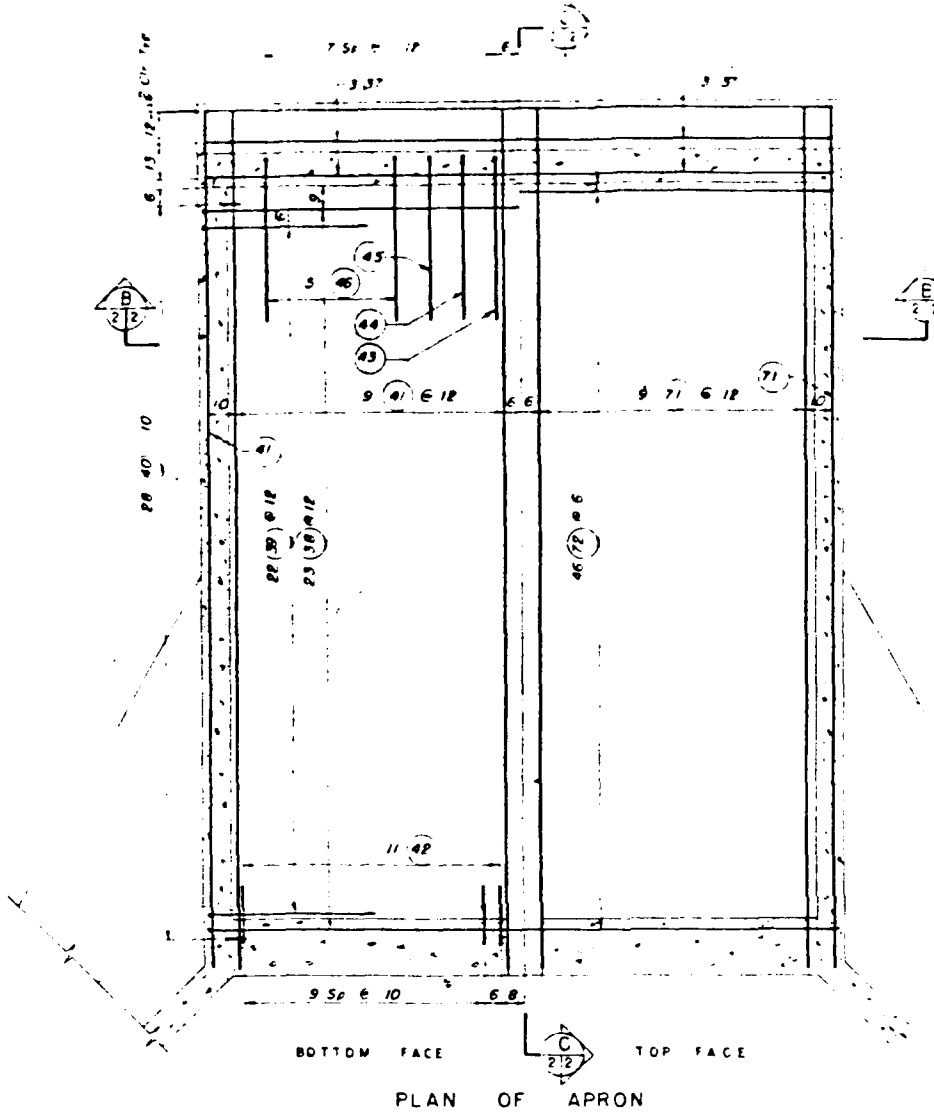
Traced

Checked

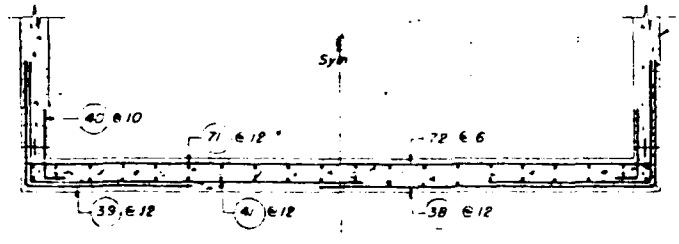
Date

Drawing No. NY-216-P

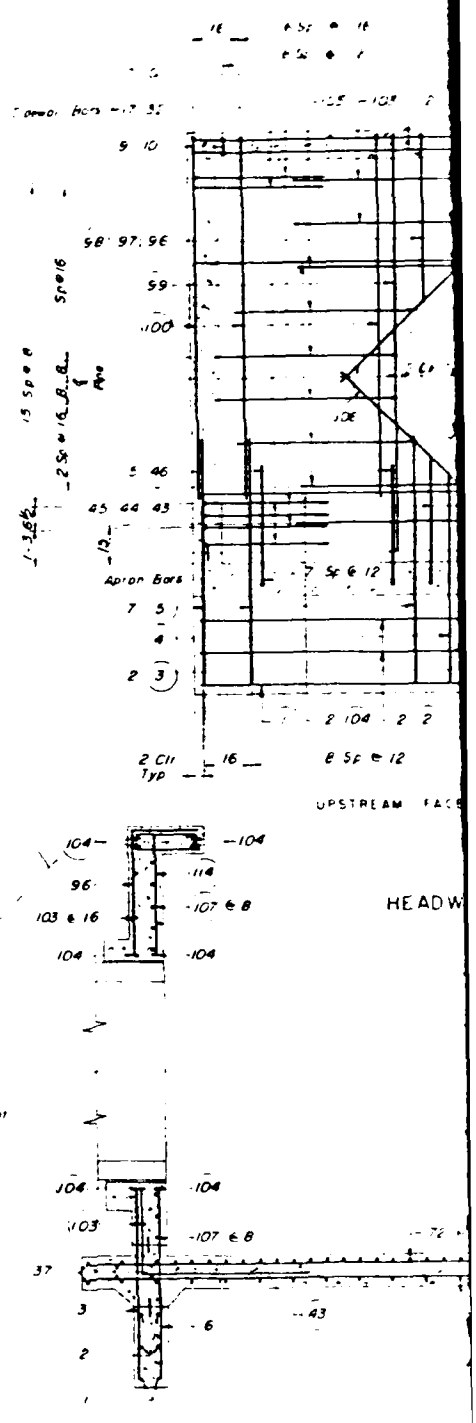
Sheet No. B-21



PLAN OF APRON

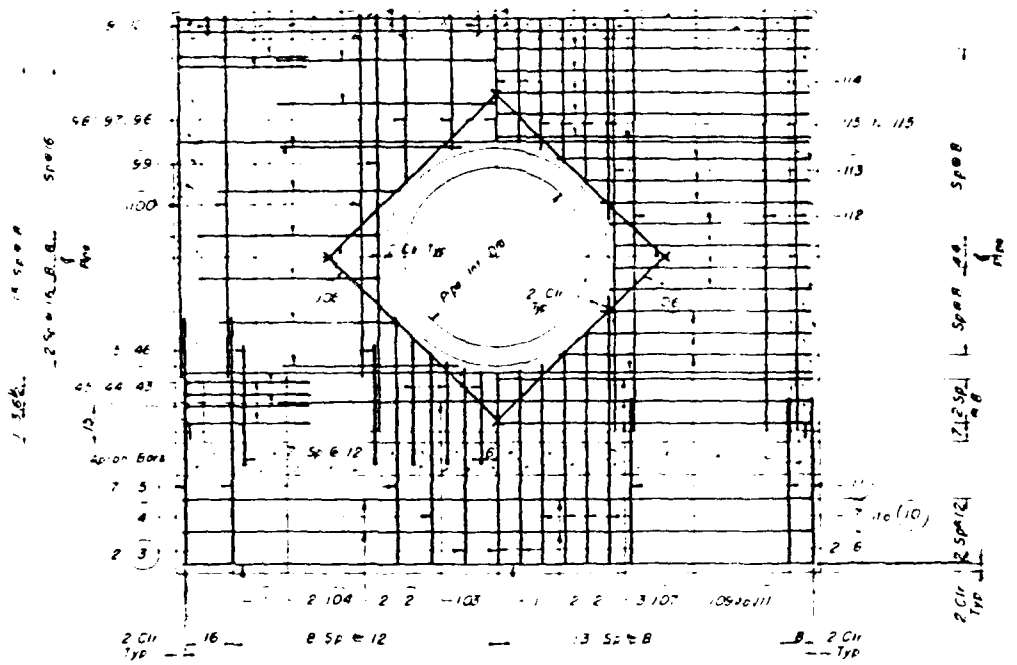


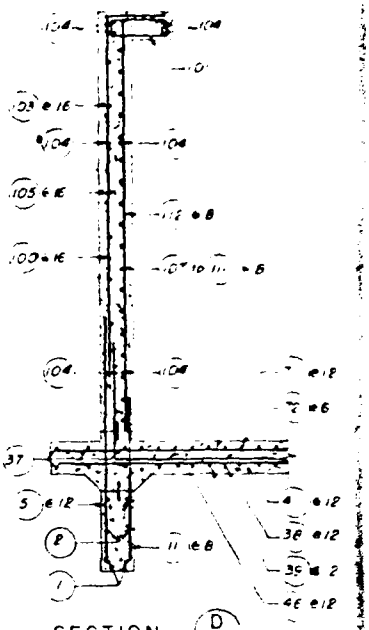
SECTION



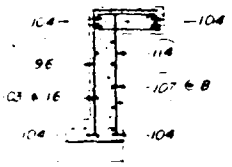
STANDARD IMPACT BASIN		
DESIGN CONSTANTS f'_c 4000 psi n 8	f_y 1600 psi f_s 20,000 psi	CARL ROHDE Consulting Engineer 654 Ridgeway Rd Lake Oswego, Ore
STANDARD DRAWING NO ES-4175		
DATE 1-70	SHEET 2 OF 5	

SCALE IN FEET EXCEPT AS NOTED

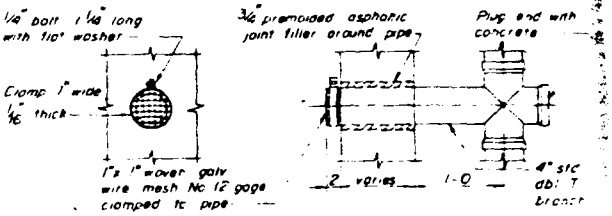




SECTION D (2:2)

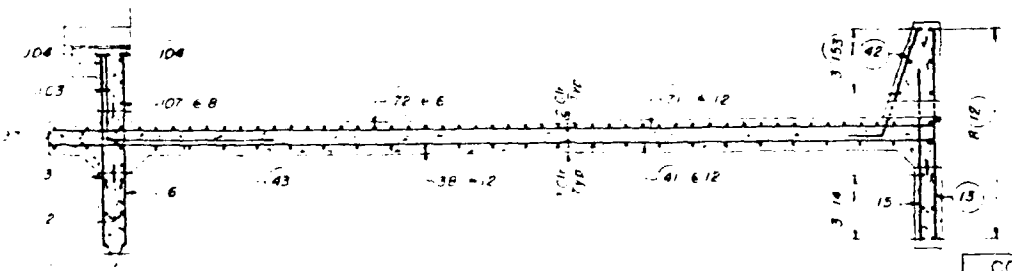


HEADWALL ELEVATION



DETAIL OF SMALL ANIMAL GUARD SCREEN AND OUTLET OF DRAIN PIPE

SCALE IN FEET



SECTION C (2:2) + C (4:2)

SCALE IN FEET EXCEPT AS NOTED

AS BUILT
8/22/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
IMPACT BASIN DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

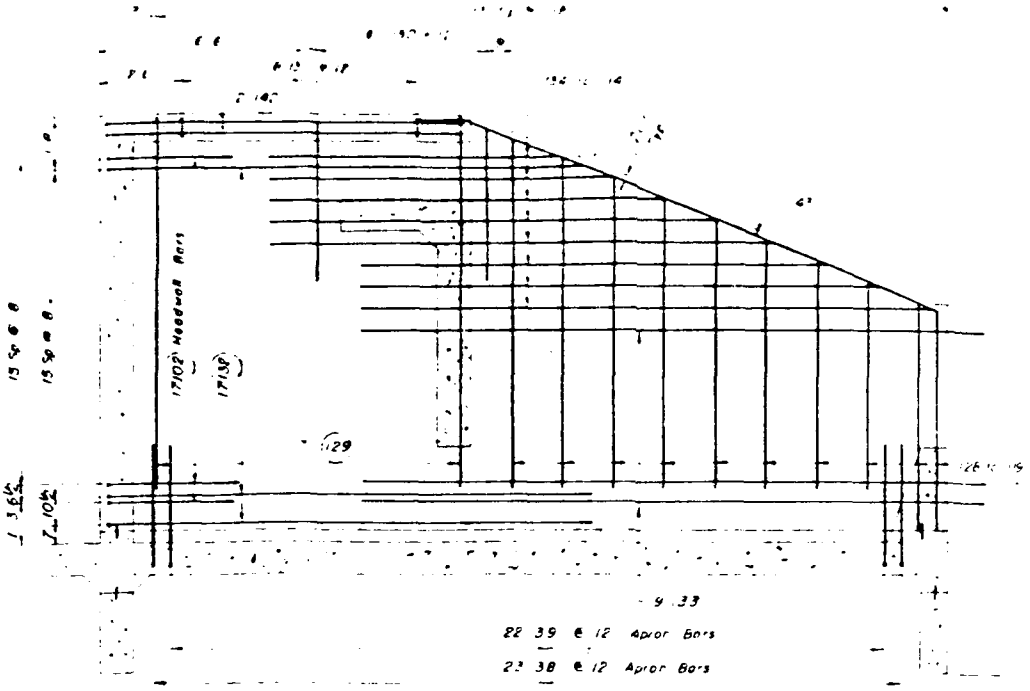
Approved J. Tuckerman 11-71

Date

NY-20, NY-216 - P

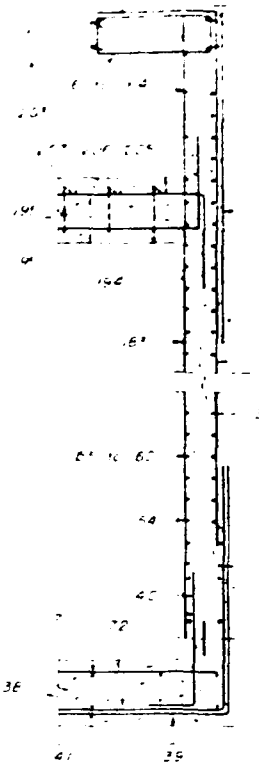
B-22

2



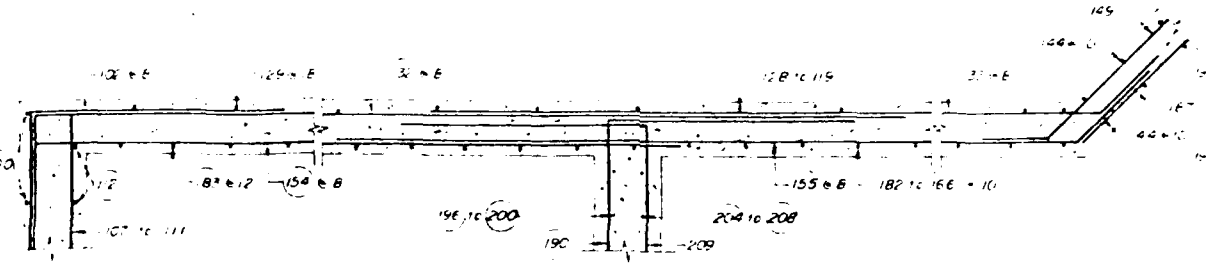
UNEXPOSED FACE

ELEVATION SIDEWALL



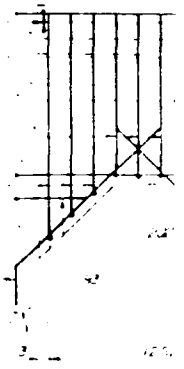
SECTION E/3 - E/3

SCALE IN FEET



SECTION F/3 - F/4

SCALE IN FEET

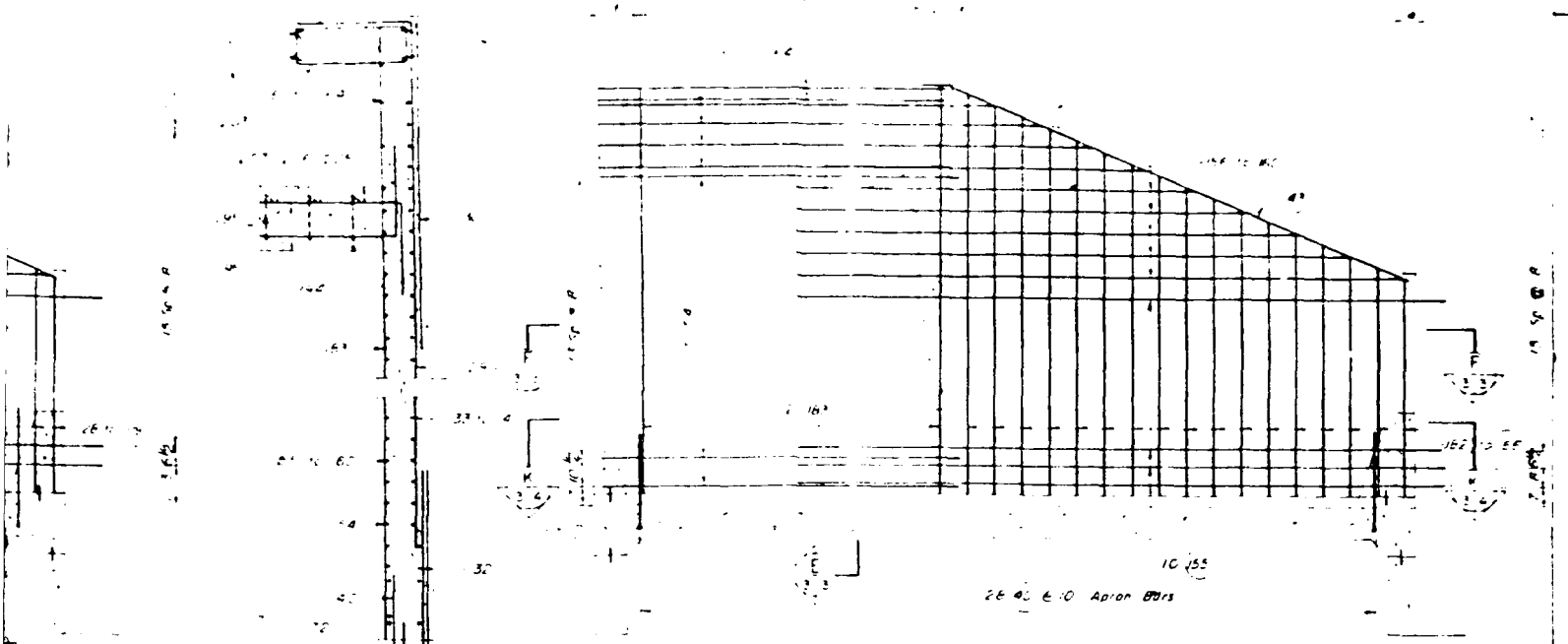


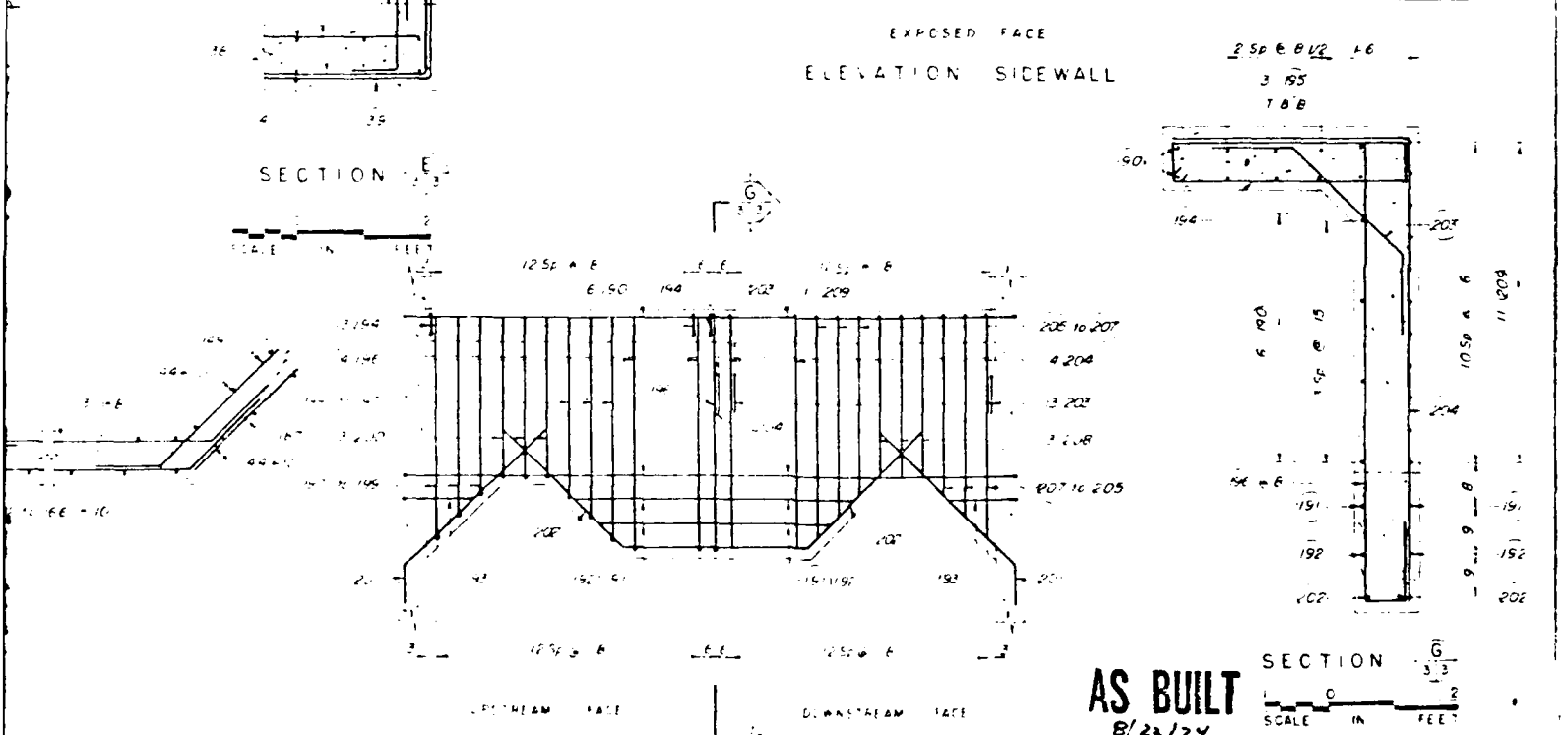
SCALE IN FEET

STANDARD IMPACT BASIN		
ESIGN CONSTANTS	f_c = 4000 psi n = 8	f_s = 1600 psi E = 20,000 psi
STANDARD DRAWING NO. ES-4175		
DATE 1-7	SHEET 3 OF 5	

CARL ROHDE
Consulting Engineer
654 Ridgeway Rd Lake Oswego, Ore

SCALE IN FEET
EXCEPT AS NOTED





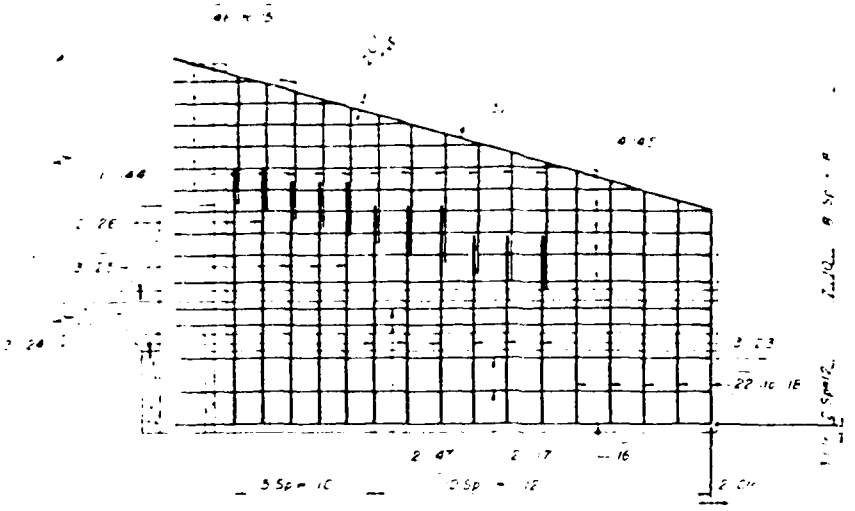
AS BUILT
8/22/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
IMPACT BASIN DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

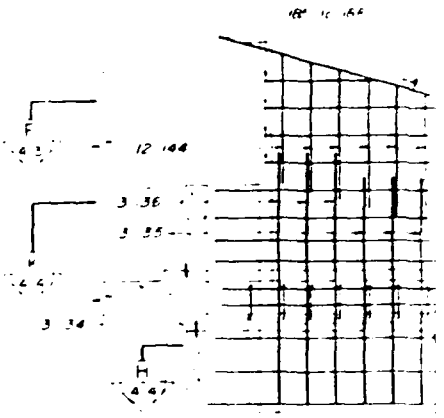
NY-216I-P

B-23



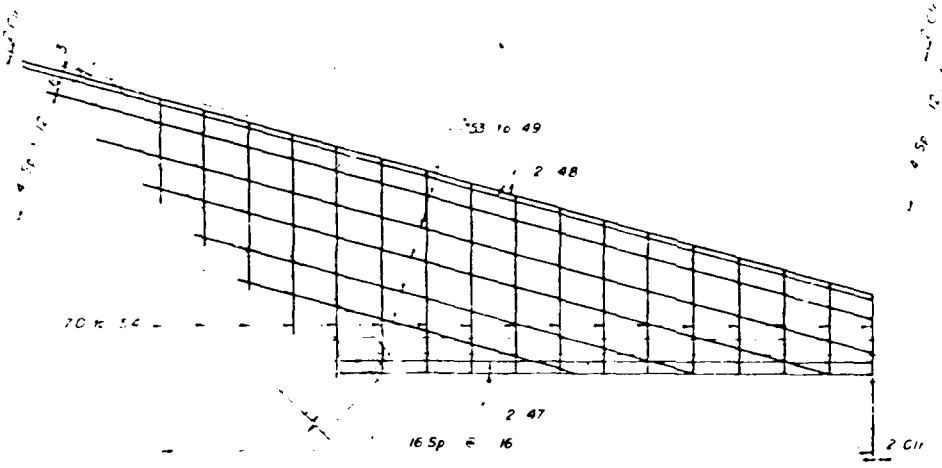
UNEXPOSED FACE

WINGWALL ELEVATION

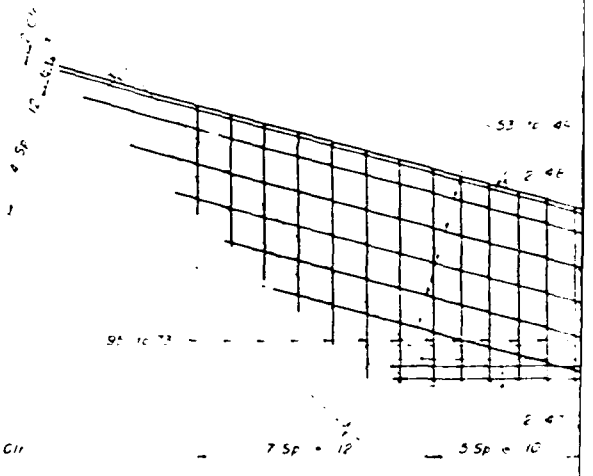


EXPO

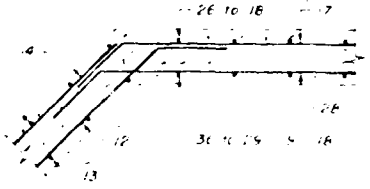
WINGWA



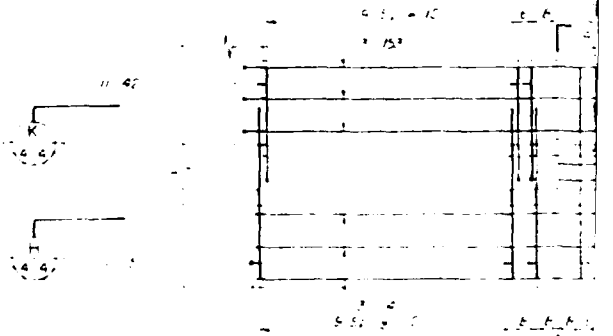
PLAN WINGWALL FOOTING - BOTTOM FACE



PLAN WINGWALL FOO



SECTION H



UPSTREAM FACE

ELEVATION OF END

SCALE IN FEET

1 0 2

SCALE IN EXCEPT AS

...ARD IMPACT BASIN

...ACCESS ... ACCESS

...: 25,000 ...

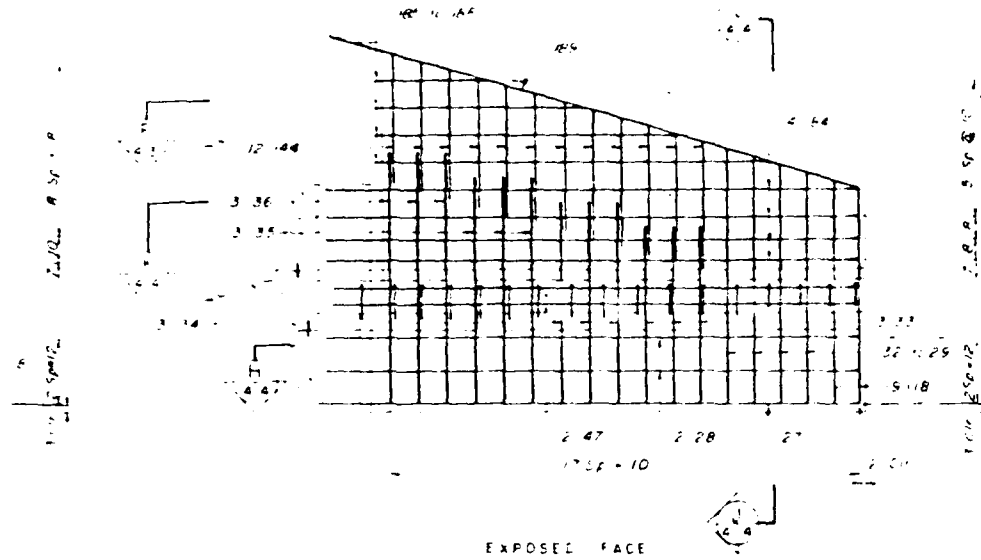
ES-4175

SHEET 4 OF 5

CARL ROHDE

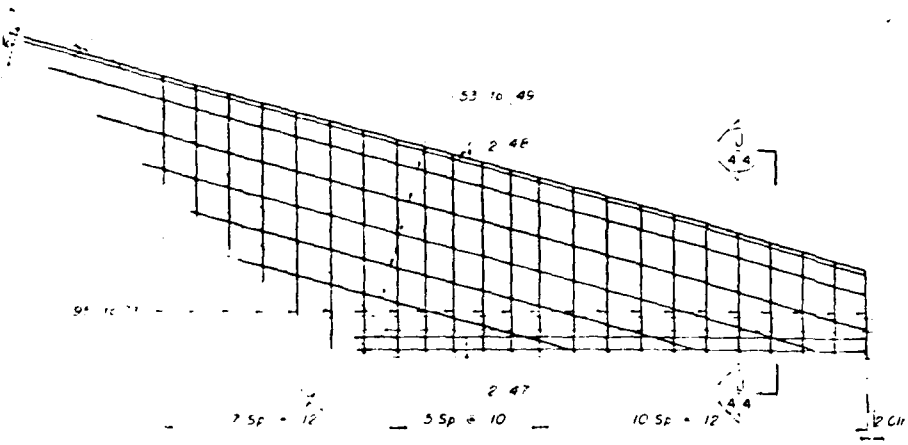
Consulting Engineers

...Kearny Rd ... Diego, Ca...

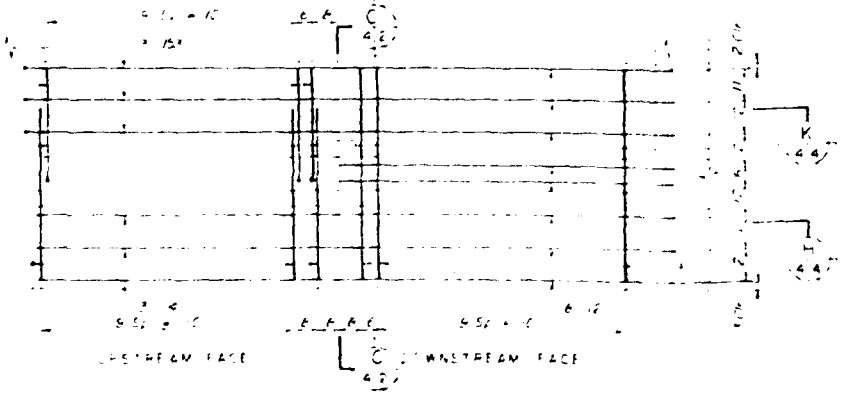


EXPOSED FACE

WINGWALL ELEVATION

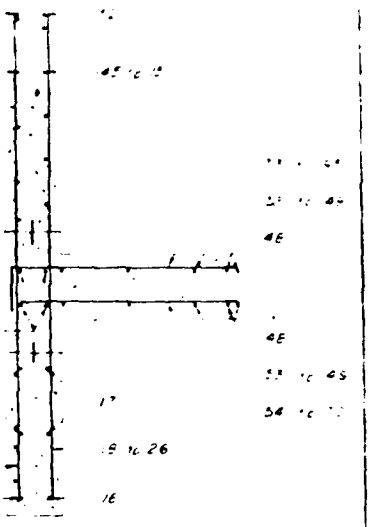


PLAN WINGWALL FOOTING - TOP FACE



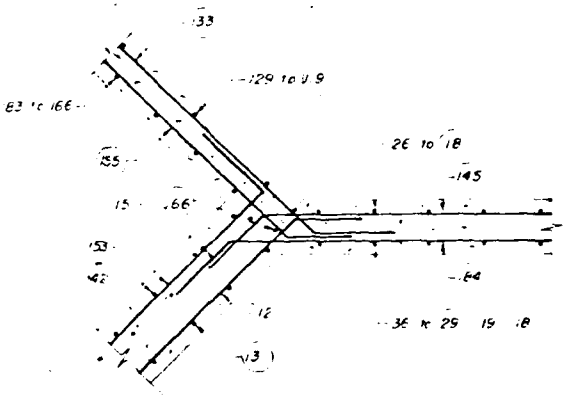
ELEVATION OF END SILL & TEEWALL

SCALE IN FEET
EXCEPT AS NOTED



SECTION J 4 4

SCALE IN FEET



SECTION K 4 4 - K 3 4

SCALE IN FEET

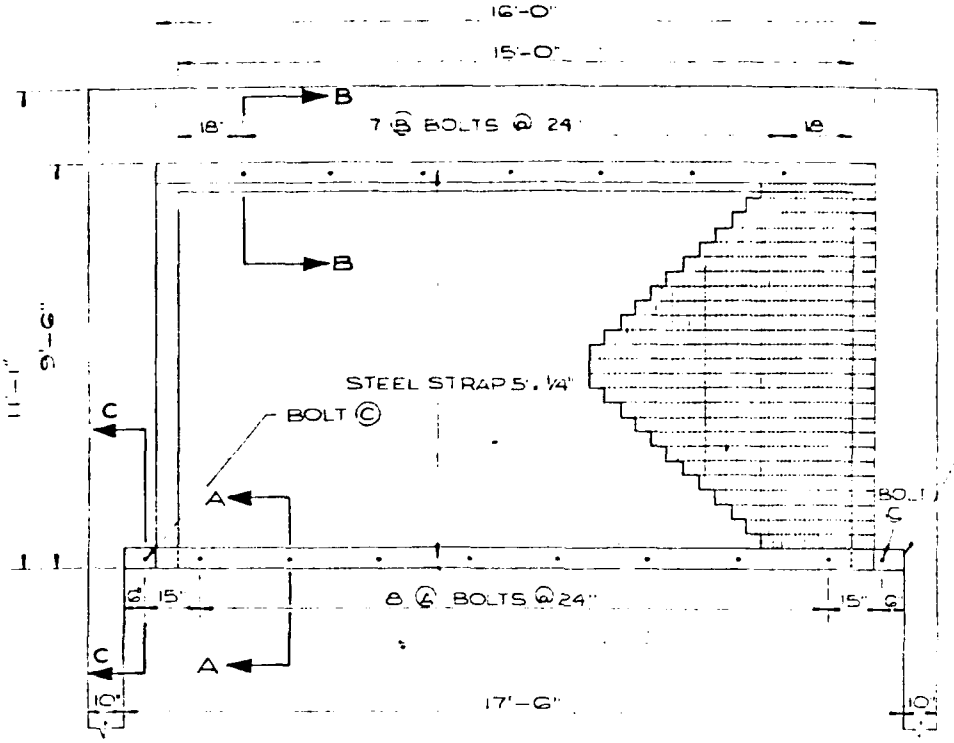
AS BUILT
8/22/74

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
IMPACT BASIN DETAILS

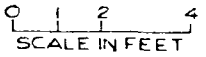
U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

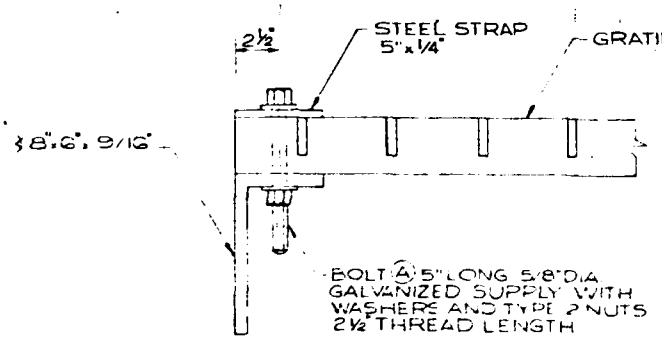
22 NY-26-F

B-24

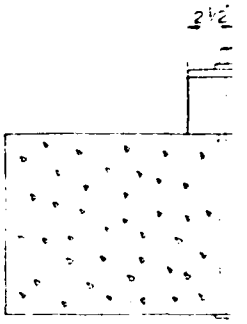


PLAN VIEW

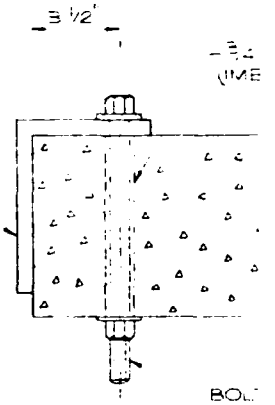




SECTION A-A

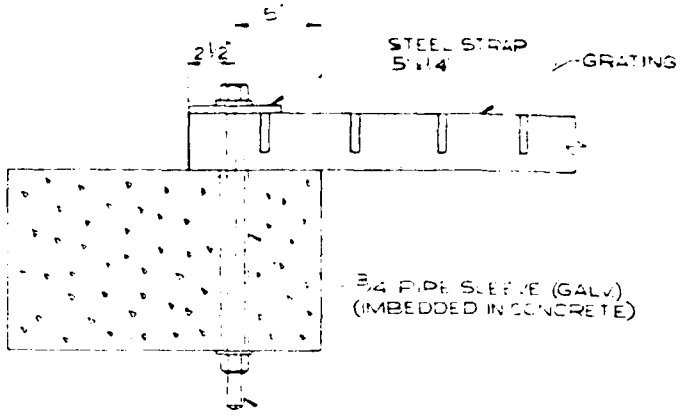


SECTION B-B

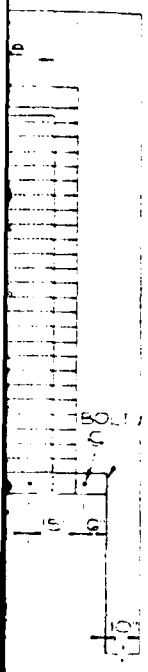


SECTION C

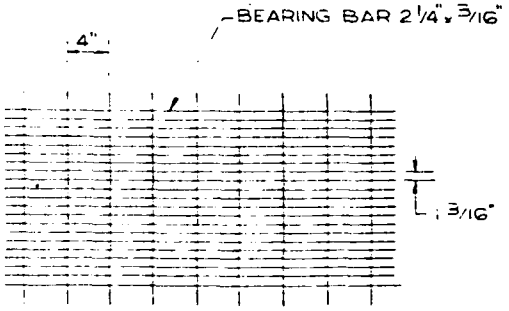
IMPACT BASIN GRATING BILL OF MATERIAL			
ITEM	SIZE	LENGTH	QUANTITY
GRATING PANEL	9'-6"x6'-0"		
STRAP	5" x 1/4"	16'-0"	2
ANGLE IRON	6"x6"x5/16"	17'-6"	1
BOLT A	5/8" DIA	5"	8
BOLT B	5/8" DIA	14"	7
BOLT C	5/8" DIA	12"	2
PIPE SLEEVES	3/4" DIA	10"	9



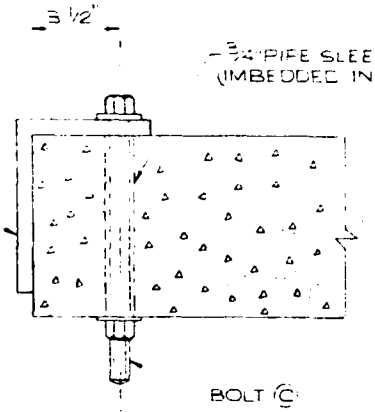
SECTION B-B



BOLT B 14" LONG
5/8" DIA GALVANIZED
SUPPLY WITH WASHER
AND TYPE 2 NUTS 2 1/2"
THREAD LENGTH



GRATING PANEL GALVANIZED (NOT TO SCALE)



BOLT C
12" LONG
5/8" DIA GALVANIZED
SUPPLY WITH WASHERS
AND TYPE 2 NUTS 2 1/2"
THREAD LENGTH

SECTION C-C

CONSTRUCTION DETAILS

1. MATERIAL IN IMPACT BASIN GRATING SHALL CONFORM TO SPEC 581 FOR STRUCTURAL STEEL
2. ENTIRE IMPACT BASIN GRATING TO BE GALVANIZED IN ACCORDANCE WITH SPEC 582.

8/22/74
AS BUILT

CONEWANGO CREEK WATERSHED
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
IMPACT BASIN GRATING

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

	Date
Designed JD TOENNIESSEN	11/71
Drawn WILLIAM TURNER	11/71
Traced	
Checked	

NY-216-P

2

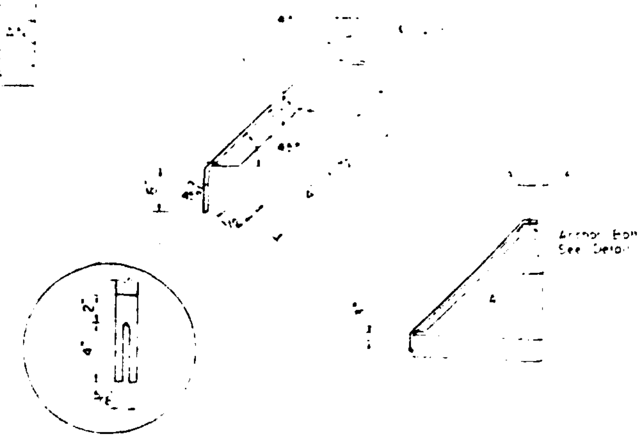
B-25

... TRASH RA... OF MATERIALS		
[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	2' ... 4

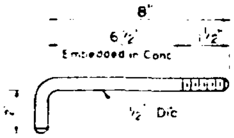
CONSTRUCTION DETAILS

Materia[illegible] reservoir drain trash rack and conform to Spec 58 for structural stee[l]

2 Trash rack to be galvanized in accordance with Spec 582

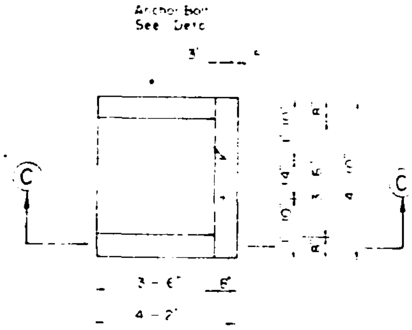


TRASH RACK

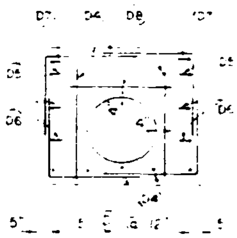


ANCHOR BOLT

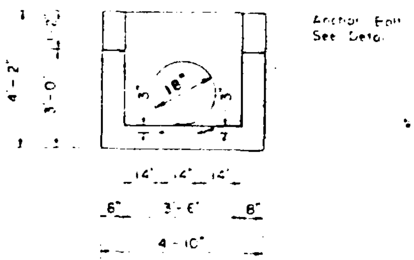
Material to conform to Spec 58



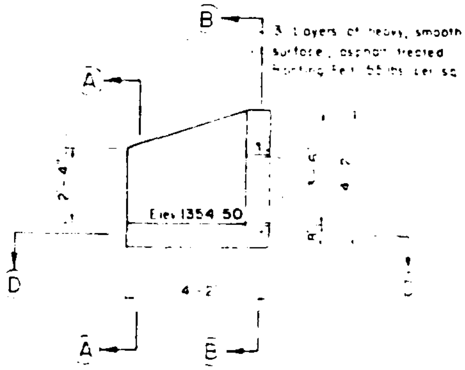
PLAN



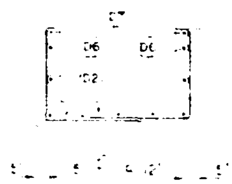
SECTION BB



UPSTREAM ELEVATION

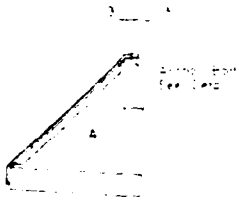


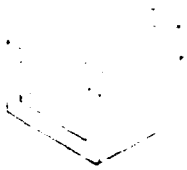
SECTION ALONG CENTERLINE



SECTION AA

REINF. CONCRETE RESERVOIR DRAIN INLE[T]





ISOMETRIC

RESERVOIR "A" STEEL SCHEDULE

Mark	Quan.	Size	Length	Type	A	B	C	D	E
	1	4	3'-0"						
C-2	4	4	5'-0"	2	2'-6"	1'-5"	1'-6"	2'-6"	
C-3	4	4	6'-0"	2	2'-6"	1'-5"	1'-6"	3'-6"	2'-6"
C-4	4	4	5'-0"	2	2'-6"	1'-5"	1'-6"	2'-6"	
C-5	2	4	2'-6"	2	2'-6"	1'-5"	1'-6"		1'-6"
C-6	4	4	4'-6"	2	3'-6"	1'-5"	1'-6"		3'-6"
C-7	2	4	4'-6"	2	3'-6"	1'-5"	1'-6"		3'-6"
C-8	3	4	3'-6"	1					

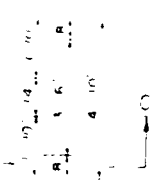
QUANTITIES (This Sheet Only)

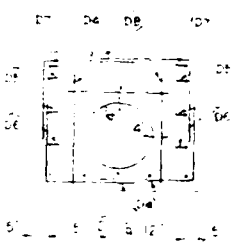
STEEL

No. 4 Bar 126.3 lbs. 64 lbs.

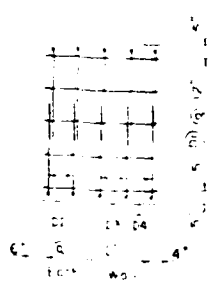
CONCRETE

1.4 Cu. Yds. Reinforced



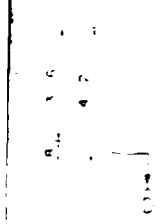


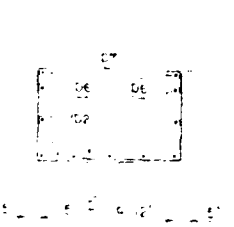
SECTION BB



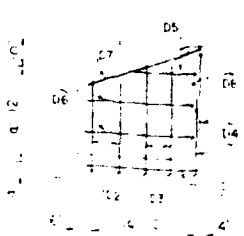
SECTION DD

[illegible] layers of heavy, smooth [illegible] before asphalt treated [illegible] per sq.





SECTION AA



SECTION CC

8/22/74

AS BUILT

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
RESERVOIR DRAIN INLET DETAILS

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Designed J. E. POLULECH 3-70
Drawn D. J. ANGELO
W. E. GRAJKO Jr. 3-70

[illegible]

CENTERLINE

[illegible] CONCRETE RESERVOIR DRAIN INLET

2

B-26

MATERIAL DESCRIPTIONS
CONTINUATION

A

Gravel, sandy, w/little silt (55-61% gravel, 31-34% sand, 11-5% fines); Max size 20", 5-8% +6", 15-6% 3-6"; gray-brown; moist, saturated in parts of flood plain; rapid permeability, non-plastic; medium-dense; alluvial and glacio-fluvial (outwash); DS 303.1 and DS 202.2 (GW-GP)

B

Gravel, sandy, w/little silt (63% gravel, 2?% sand, 10% fines); Max size 20", 7%+6", 18% 3-6"; brown; moist; rapid permeability; non-plastic; medium-dense; alluvial; DS 205.2 (GW-GP)

C

Sand, gravelly, w/little silt (20% gravel, 69% sand, 11% fines); Max size 2½", brown; moist-sat.; rapid permeability; non-plastic; medium; alluvial; DS 5.1; (SM-SW)

D

Sand, gravelly, w/silt and clay (30% gravel, 45% sand, 17% fines); Max size 8", 3%-3"; gray-brown; moist; moderate permeability; LL=19, PI=5; hard; alluvial; DS 7.2; (SC-SM).

E

Gravel, silty w/sand (33-28% gravel, 27--26% sand, 46-40% fines); max size 15", 3%+6", 8% 3-6"; color grades from brown to gray with depth; moist-wet; permeability varies from impermeable to rapid; non-plastic; dense-very dense; glacial till; DS 204.1 (gray), 206.1 (brown); (GM)

F

Silt and clay, sandy w/gravel (23-20% gravel, 27-25% sand\ 53-52% fines); max size 6", 2% +3" brown-yellow brown; moist; moderate permeability; non-plastic to LL=23, PI=6; hard; colluvial; DS 202.1 (ML), 7.1 (CL-ML).

G

Silt and clay, gravelly, w/sand (25% gravel, 19% sand, 56% fines); max size 3"; red-brown; moist; slight permeability; LL=32, PI=11; very stiff; lacustrine; DS 102.1 (CL-ML).

H

Silt, sandy (1% gravel, 38% sand, 61% fines); max size 3/4"; brown; wet-saturated; rapid permeability; non-plastic; medium-dense; lacustrine, DS 301.2 (ML)

I

Silt, sandy w/gravel (12-11% gravel, 15-12% sand, 76-74% fines); max size 1"; brown-yellow brown; moist; moderate permeability; non-plastic; loose-medium; colluvial; DS 205.1 and "HR" (ML)

J

Silt and clay, sandy (2% gravel, 6% sand, 92% fines); max size 3/4"; brown; moist-saturated; slight-moderate permeability; LL=36, PI=13; very stiff; lacustrine; DS 206.1 (CL-ML).

K

Silt (100% fines); max size 2 mm.; grey and brown; moist-saturated; slight-moderate permeability; non-plastic; dense; lacustrine; DS's 4.1 and 301.1 (ML)

L

Topsoil, gravelly in flood plain; some roots and organic material; brown; moist; medium to rapid permeability; loose; ave. thickness ~ 1.0'.

M

Gravel, sandy w/silt (est. 55% gravel, 30% sand, 15% fines); max. size 20"; 5% +6", 15% 3-6"; gray-brown; moist; rapid permeability; non-plastic; very, very dense (n)) 100); cemented alluvial gravel, stratified. (GM)

MATERIAL DESCRIPTIONS

TP #1, C/L Dam 8/29/68 DBC 1371.1

0.0	1.5	Material L	(Topsoil)
1.5	3.5	" I	(ML)
3.5	11.5	" B	(GW-GP)
11.5	13.5	" E	(ML)

Note: Dry Pit.

TP #2, C/L Dam 8/29/68 DBC 1367.6

0.0	1.0	Material L	(Topsoil)
1.0	1.8	" I	(ML)
1.8	3.0	" B	(GW-GP)
3.0	10.5	" A	(GW-GP)
10.5	13.0	" E	(ML)

Note: Water level @ 10.0'

TP #3, C/L Dam 8/30/68 DBC 1364.8

0.0	1.0	Material L	(Topsoil)
1.0	11.7	" A	(GW-GP)
11.7	15.2	" K	(ML)

Note: Dry pit

TP #4, C/L Dam 8/29/68 DBC 1360.6

0.0	1.0	Material L	(Topsoil)
1.0	8.2	" A	(GW-GP)
8.2	9.2	" AAC	(GW-GP, SW-SM)
9.2	16.5	" K	(ML) D.S. 4.1

Note: Water level @ 8.0'

TP #5, C/L Dam 8/27/68 DBC 1372.8

0.0	0.5	Material L	(Topsoil)
0.5	4.0	" A	(GW-GP)
4.0	7.5	" C	(SM-SW) D.S. 5.1
7.5	12.0	" K & M interbeds	(ML)

Note: Water level @ [illegible]. Materials K & M are often rhythmically bedded.

TP #6, C/L Dam 8/27/68 DBC 1353.3

0.0	3.0	Material A	(GW-GP)
3.0	11.0	" M	(GM)

Note: Water level @ surface (pit in stream). Break based on degree of difficulty of digging.

TP #7, C/L Dam 8/27/68 DBC 1379.3

0.0	1.0	Material L	(Topsoil)
1.0	12.0	" F	(CL-ML) D.S. 7.1
12.0	14.0	" D	(SC-SM) D.S. 7.2

Note: Small seep @ 11.0'. Starts to slough @ 9.7'

TP #101, Borrow Area 8/29/68 DBC 1377.7

0.0	1.0	Material L	(Topsoil)
1.0	13.0	" E	(GM) (brown)

Note: Dry pit.

TP #102, Borrow Area 8/29/68 DBC 1372.1

0.0	1.0	Material L	(Topsoil)
1.0	2.0	" I	(ML)
2.0	5.0	" A	(GW-GP)
5.0	7.0	" C	(CL-ML) D.S. 102.1
7.0	12.0	" E	(GM)(brown)

Note: Water level @ 7.0'

TP #103, Borrow Area 8/29/68 DBC [illegible]

0.0	1.0	Material L	(Topsoil)
1.0	2.5	" I	(ML)
2.5	6.0	" B	(GW-GP)
6.0	14.0	" E	(GM) brown

Note: Dry pit

TP #201, Borrow Area 8/29/68 DBC [illegible]

0.0	1.5	Material L	(Topsoil)
1.5	17.0	" E	(GM) brown

Note: Dry pit

TP #202, Emergency Spillway 8/29/68

0.0	1.0	Material L	(Topsoil)
1.0	2.5	" F	(ML) D.
2.5	5.0	" I	(ML)
5.0	8.0	" A	(GW-GP)
8.0	16.0	" E	(GM) brown
16.0	18.0	" E	(GM) gray

Note: Dry pit

TP #203 Emergency Spillway 8/29/68

0.0	1.0	Material L	(Topsoil
1.0	3.0	" I	(ML)
3.0	7.0	" B	(GW-GP)
7.0	16.0	" E	(GM) brown

Note: Slight seep @ 13.0' between materials E and not very distinct

TP #204 Emergency spillway 8/29/68

0.0	1.0	Material L	(Topsoil)
1.0	10.0	" E	(GM) brown
10.0	14.4	" E	(GM) gray
14.4	17.0	" E	(GM) brown

Note: Water level at 17.0' sandier between 14-

TP #205 Emergency Spillway 8/29/68

0.0	0.5	Material L	(Topsoil)
0.5	1.8	" I	(ML) D.
1.8	11.0	" B	(GW-GP)
11.0	15.0	" E	(GM) brown

Note: Dry pit. Soil scientist c (Mat'l I) the B2j horizo Fa. phase and DS 207.1 (horizo of the Cheata so

TP #206 Emergency Spillway 8/29/68

0.0	0.7	Material L	(Topsoil
0.7	1.8	" I	(ML)
1.8	9.0	" B	(GW-GP)
9.0	16.0	" E	(GM) brown

Note: Dry pit

TP #207 Emergency Spillway 8/29/68

0.0	1.0	Material L	(Topsoil)
1.0	2.5	" I	(ML)
2.5	6.0	" B	(GW-GP)
6.0	14.7	" E	(GM) brown
14.7	16.0	" J	(CL-ML)

Note: Slight seep @ 14.5'

TP #[illegible] Borrow Area 8/[illegible]/68 DBC [illegible]

[illegible]	[illegible]	Material	L (Topsoil)
[illegible]	[illegible]	"	I (ML)
[illegible]	[illegible]	"	B (GM-GP)
[illegible]	14.0	"	E (GM) brown

Note: Dry pit

TP #201 Emergency Spillway 8/29/68 DBC 1389.0

[illegible]	1.5	Material L	(Topsoil)
1.5	17.0	"	E (GM) brown

Note: Dry pit

TP #202 Emergency Spillway 8/29/68 DBC 1414.2

[illegible]	1.0	Material L	(Topsoil)
1.0	2.5	"	F (ML) D.S. 202.1
[illegible]	[illegible]	"	I (ML)
[illegible]	8.0	"	A (GM-GP) D.S. 202.2
8.0	16.0	"	E (GM) brown
16.0	18.0	"	E (GM) gray

Note: Dry pit

TP #203 Emergency Spillway 8/29/68 DBC 1389.1

0.0	1.0	Material L	(Topsoil)
1.0	3.0	"	I (ML)
3.0	[illegible]	"	B (GM-GP)
[illegible]	13.5	"	E (GM) brown

Note: Slight seep @ 13.0'. Break between materials B and E is not very distinct

TP #204 Emergency Spillway 8/29/68 DBC 1401.0

[illegible]	[illegible]	Material L	(Topsoil)
[illegible]	10.0	"	E (GM) brown
[illegible]	14.4	"	E (GM) gray D.S. 204.1
[illegible]	[illegible]	"	E (GM) brown

Note: Water level at 17.0'. Material E is sandier between 14.4 and 17.5'

TP #[illegible] Emergency Spillway 8/29/68 DBC 1397.1

[illegible]	[illegible]	Material L	(Topsoil)
[illegible]	1.8	"	I (ML) D.S. 205.1
1.8	11.0	"	B (GM-GP) D.S. 205.2
11.0	15.0	"	E (GM) brown

Note: Dry pit. Soil scientist calls DS 205.1 (Mat'l I) the B_2 horizon of the Chenango Fan phase and DS 205.2 (Mat'l B) the IIC_1 horizon of the Chenango Fan phase.

TP #206 Emergency Spillway 8/29/68 DBC 1400.2

0.0	0.7	Material L	(Topsoil)
0.7	1.8	"	I (ML)
[illegible]	4.0	"	B (GM-GP)
4.0	16.0	"	E (GM) Brown D.S. 206.1

Note: Dry pit

TP #207 Emergency Spillway 8/29/68 DBC 1381.2

0.0	1.0	Material L	(Topsoil)
1.0	2.4	"	I (ML)
2.4	6.0	"	B (GM-GP)
6.0	14.7	"	E (GM) brown
14.7	96.0	"	J (CL-ML)

Note: Slight seep @ 14.5'

TP #[illegible] Emergency Spillway 8/29/68 DBC [illegible]

0.0	0.7	Material L	(Topsoil)
0.7	1.6	"	I (ML)
1.6	6.7	"	B (GM-GP)
6.7	12.7	"	E (GM) brown
12.7	15.0	"	J (CL-ML) DS 208.1

Note: Water level @ 12.0'. Material E is siltier than usual.

TP #209 Emergency Spillway 8/29/68 DBC 1385.8

0.0	0.8	Material L	(Topsoil)
0.8	3.5	"	B (GM-GP)
3.5	7.0	"	E (GM) brown
7.0	9.8	"	E (GM) brown
9.8	15.5	"	J (CL-ML)

Note: Water level @ 9.3'. Material E is siltier than usual (same as in TP #208) from 7.0-9.8'. Some cobbles and sandy strata in material J. Lots of flat, angular 3-4" cobbles near bottom

TP #210 Emergency Spillway 8/29/68 DBC 1392.1

0.0	1.0	Material L	(Topsoil)
1.0	1.7	"	I (ML)
1.7	4.0	"	B (GM-GP)
4.0	4.7	"	E (GM) brown
4.7	16.0	"	E (GM) brown

Note: Dry pit. Material E is siltier from 4.0-4.7'.

TP #301 Prin. Spwy (Initial) 8/27/68 DBC 1355.6

0.0	0.5	Material L	(Topsoil)
0.5	4.5	"	A (GM-GP)
4.5	6.5	"	C (SM-SW)
6.5	12.0	"	K&H interbeds (ML) DS 301.1, 301.2

Note: Water level @ 6.5'. Materials A & H are rhythmically bedded, with DS 301.1 representing the finer fraction and DS 301.2 representing the coarser fraction.

TP #302 Prin. Spwy (Initial) 8/27/68 DBC 1356.2

0.0	1.0	Material L	(Topsoil)
1.0	4.0	"	A (GM-GP)
4.0	13.0	"	K&H interbeds (ML)

Note: Water level @ 4.0'.

TP #401 Out. Chan. (Initial) 8/30/68 DBC 1357.6

0.0	1.0	Material L	(Topsoil)
1.0	7.0	"	A (GM-GP)
7.0	12.0	"	K&H interbeds (ML)
12.0	15.0	"	A (GM-GP)

Note: Water level @ 5.4'.

TP #402 Out. Chan. (Initial) 8/30/68 DBC 1351.4

0.0	1.0	Material L	(Topsoil)
1.0	7.0	"	A (GM-GP)
7.0	11.0	"	K&H interbeds (ML)

Note: Water level @ 2.5'.

TP #[illegible] Drain Line 8/[illegible]/68 DBC [illegible]

0.0	1.0	Material L	(Topsoil)
1.0	2.0	"	I (ML)
2.0	12.0	"	A (GM-GP)
12.0	14.0	"	E (ML)

Note: Water level @ 11.0'

TP #[illegible] Drain Line 8/[illegible]/68 DBC [illegible]

0.0	1.0	Material L	(Topsoil)
1.0	10.5	"	A (GM-GP)
10.5	16.0	"	E (ML)

Note: Water level @ 13.0'

TP #[illegible] Drain Line 8/[illegible]/68 DBC [illegible]

0.0	11.0	Material A	(GM-GP) D.S. [illegible]
11.0	12.0	"	K&H interbeds (ML)

Note: Water level @ [illegible]

TP #[illegible] Drain Line [illegible]/68 DBC [illegible]

0.0	1.0	Material L	(Topsoil)
1.0	[illegible]	"	A (GM-GP)
[illegible]	14.0	"	E (GM)

Note: Dry pit. Hard digging in Material E. DS [illegible] from [illegible] above pit 504. See plan & profiles.

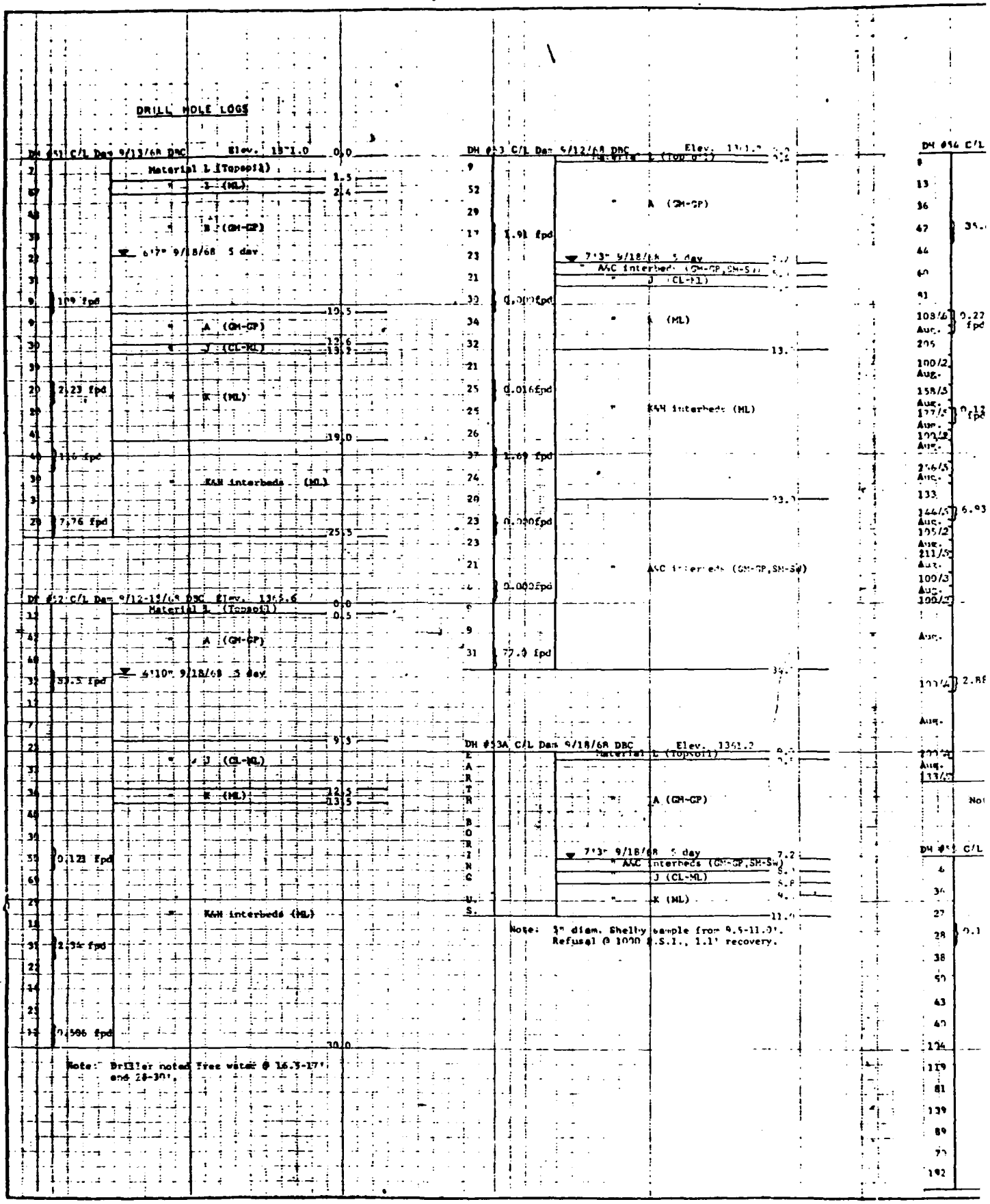
8/22/74
AS BUILT

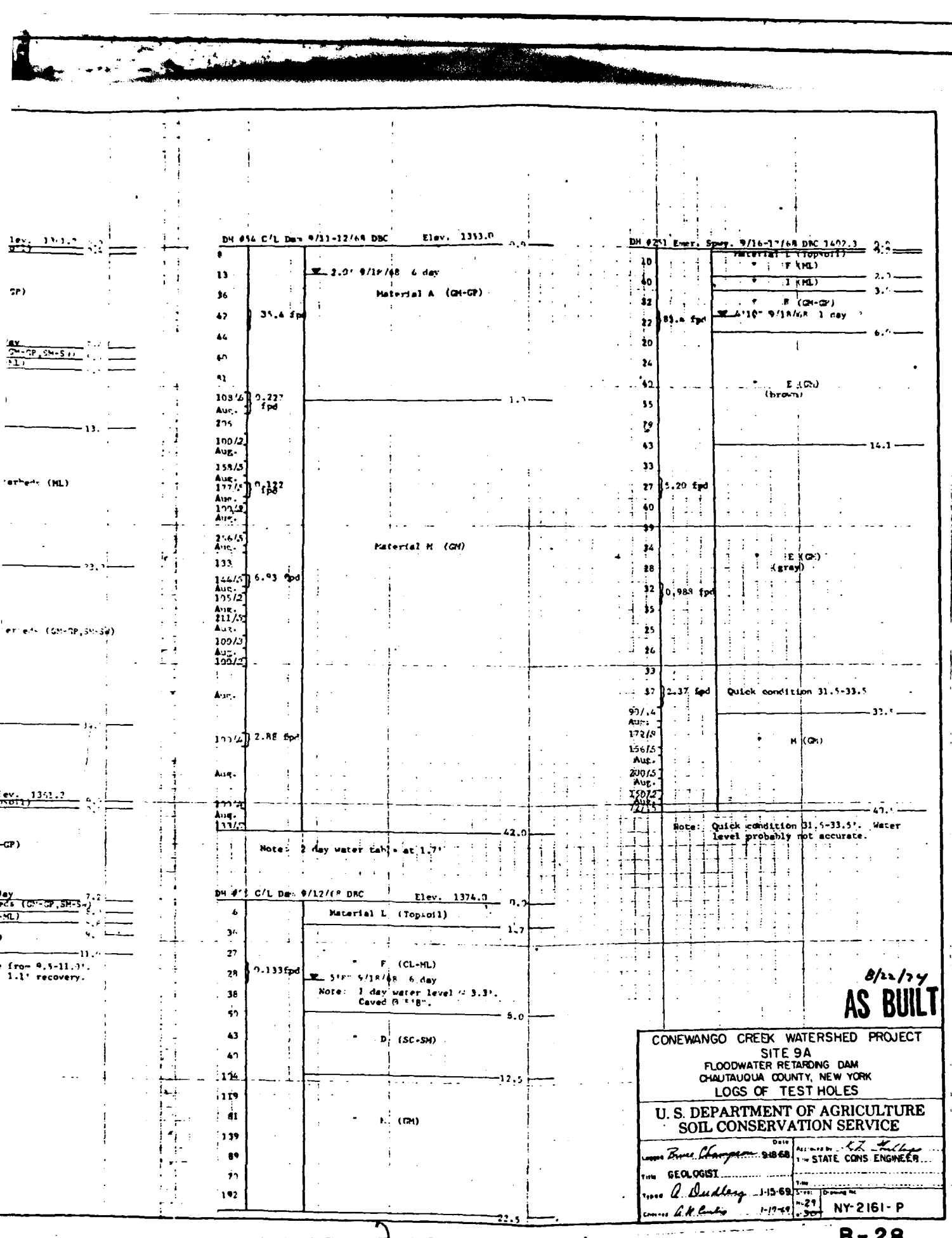
CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
LOGS OF TEST HOLES
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Logged Bruce Champion Date 9/18/68 [illegible] STATE CONS ENGINEER
Title GEOLOGIST
Traced L. Sudley 11/69
Checked [illegible] Date [illegible] SCS-ENG-216 - P

B-27

DRILL HOLE LOGS



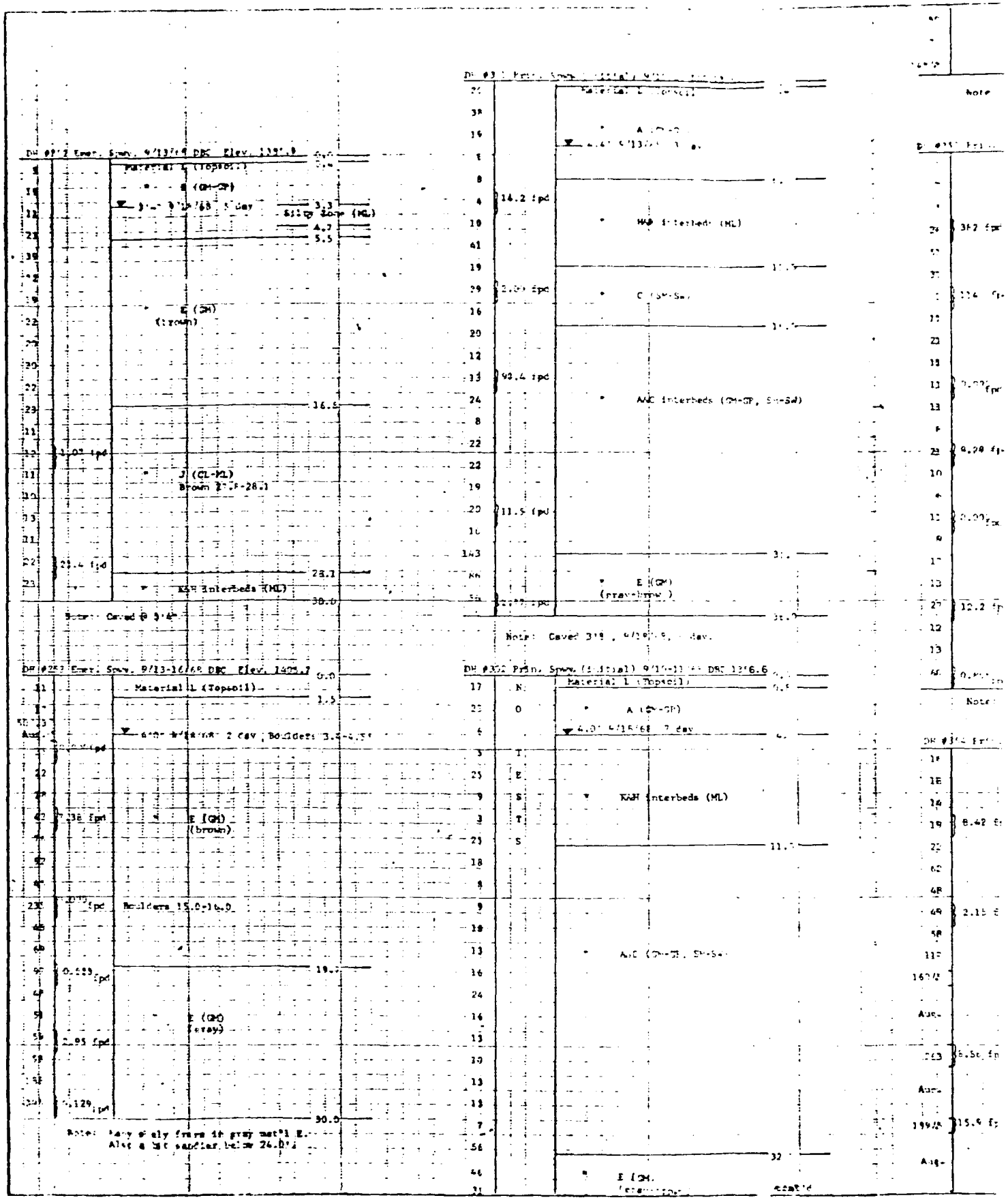


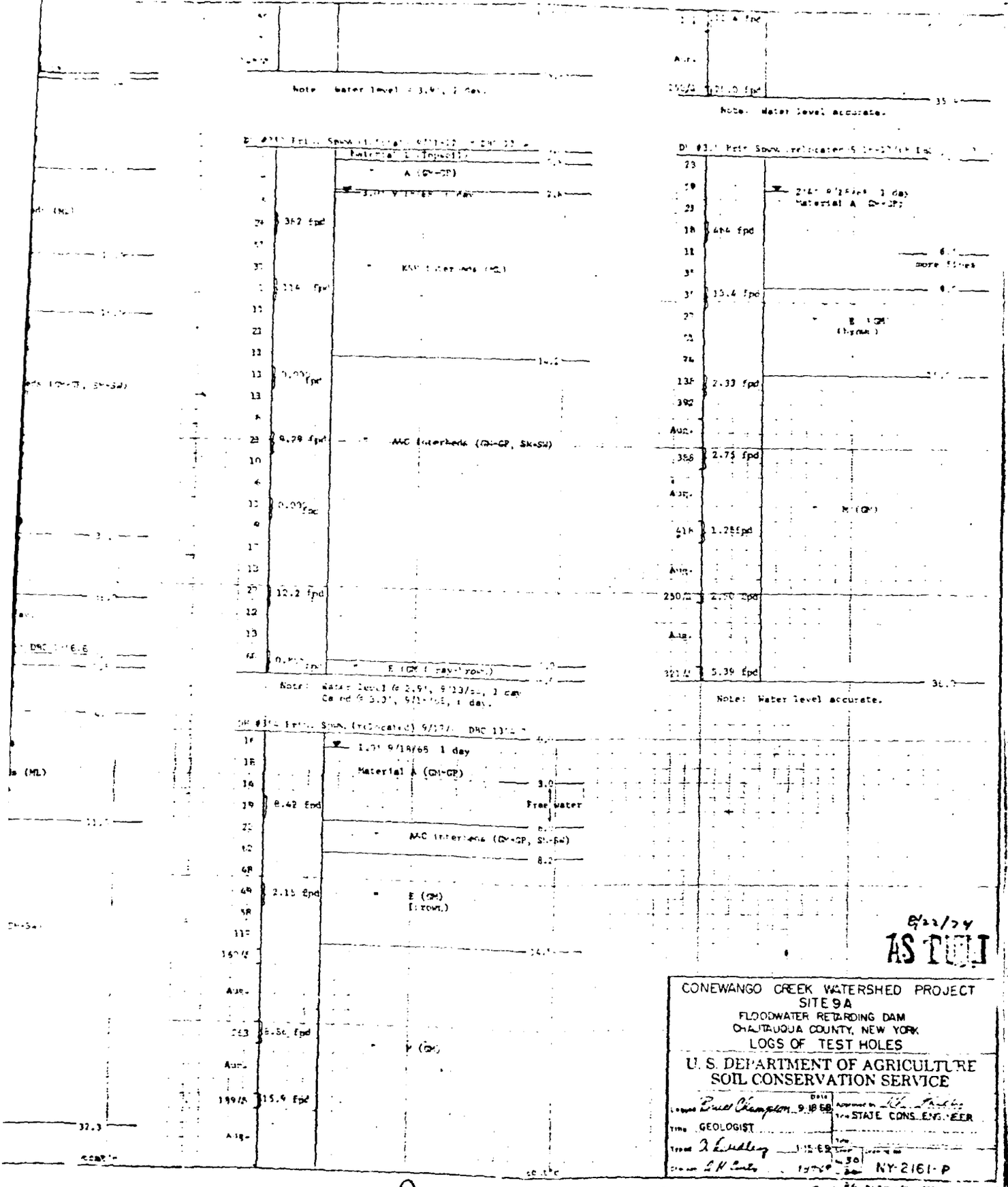
CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
LOGS OF TEST HOLES

U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

Logged Bruce Thompson Date 9-18-68
Title GEOLOGIST
Typed R. Dudley 1-15-69
Checked A.W. Curtis 1-17-69
Approved by K.Z. Tillay
Title STATE CONS ENGINEER
Sheet No. 29 of Sheets
Drawing No. NY-2161-P

B-28


DH #252 Emer. Spwy. 9/13-16/68 DRC Elev. 1425.7
Material 1 (Topsoil)
0.0
1.5
Water encountered 2 day, Boulders 3.5-4.5'
E (GM)
(brown)
Boulders 15.0-16.0
19.7
E (GM)
(gray)
30.0
Note: Many of ely frame it gray mat'l E...
Also a lot sandier below 24.0'±
DH #253 Emer. Spwy. 9/13/68 DRC Elev. 1395.7
E (GM)
(brown)
J (CL-ML)
Brown 17.5-28.1
23.4 tpd
28.1
KAH Interbeds (ML)
30.0
Note: Caved @ 3'4"
DH #3 Prin. Spwy. (Initial) 9/14-15/68 DRC 1396.6
Material 1 (Topsoil)
0.0
A (GP-GM)
4.0' 9/15/68 7 day
14.2 tpd
HAH Interbeds (ML)
17.5
C (SM-SW)
2.00 tpd
93.4 tpd
AAC Interbeds (GM-GP, SW-SP)
11.5 tpd
E (GM)
(gray-brown)
Note: Caved 3'9", 9/16/68, 1 day.
DH #252 Prin. Spwy. (Initial) 9/14-15/68 DRC 1396.6
Material 1 (Topsoil)
0.0
A (GP-GM)
4.0' 9/15/68 7 day
KAH Interbeds (ML)
11.7
AAC (GM-GP, SW-SP
32
E (GM
(gray-brown)



8/22/74

AS BUILT

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK
LOGS OF TEST HOLES

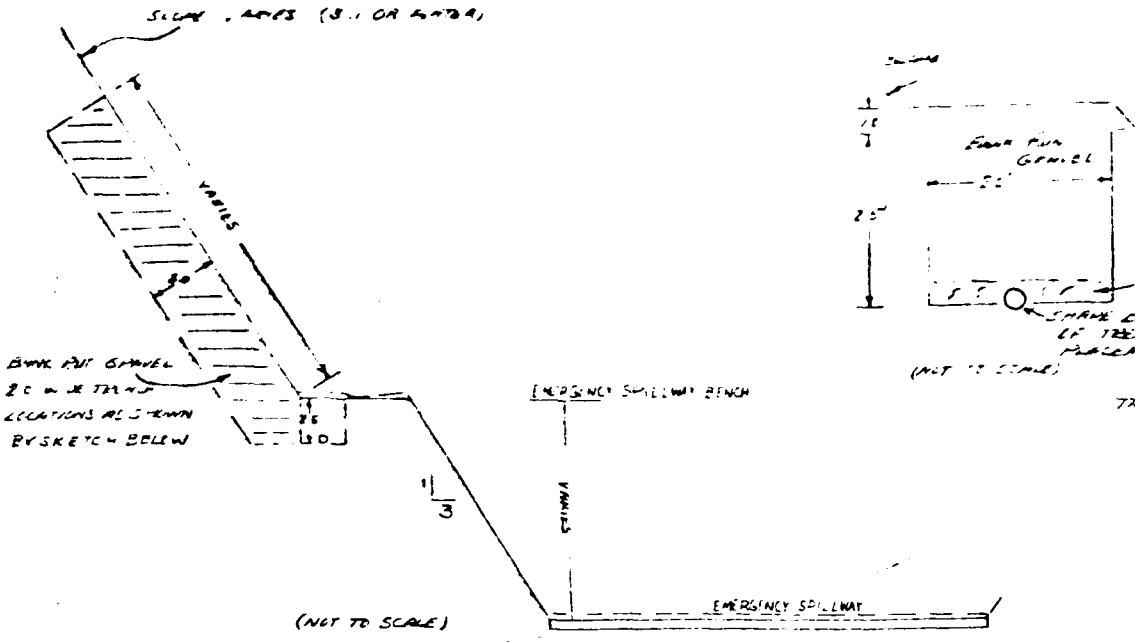
U. S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

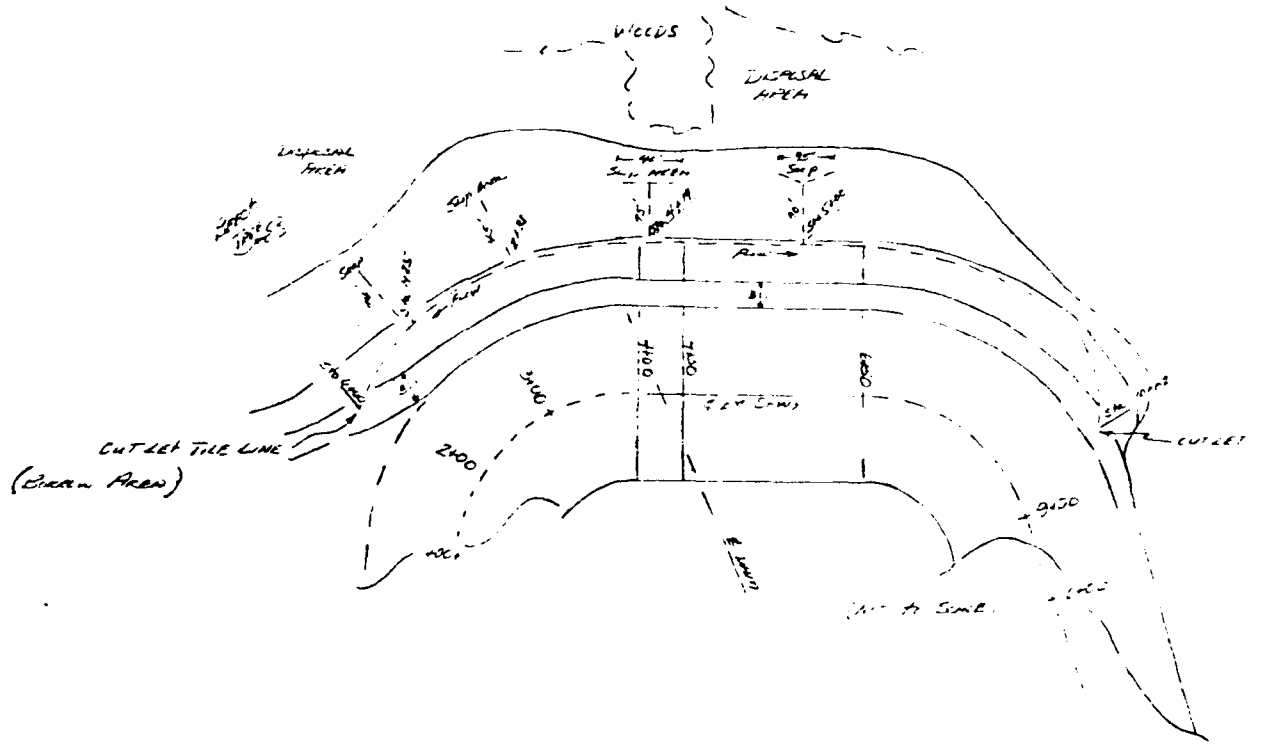
Logged by Bruce Champion Date 9.18.68
Title GEOLOGIST
Traced J Ludley 1.15.69
Drawn L N Cole 1/17/69

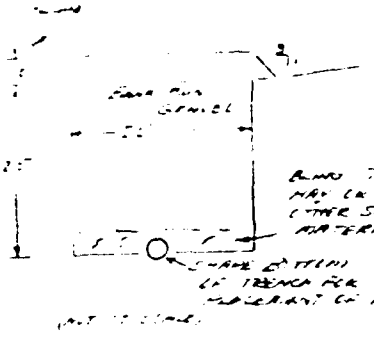
Approved by [illegible]
Title STATE CONS. ENG. - EER
Date
Sheet 36
NY-2161-P

2

B-29


VARIES
BANK RUN GRAVEL
EMERGENCY SPILLWAY BENCH
VARIES
1/3
EMERGENCY SPILLWAY
(NOT TO SCALE)
FINE PUN GRAVEL
(NOT TO SCALE)

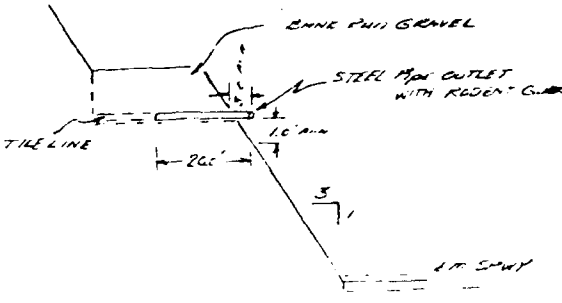

WOODS
DISPOSAL AREA
DISPOSAL AREA
CUTLET TILE LINE
(GRASS AREA)
CUTLET
2400
3400
4400
9450



(NOT TO SCALE)

THE TILE SHALL NOT BE LESS THAN FOLLOWING THE EL OF THE BOTTOM SLOPE NOR GREATER THAN 84"

OUTLET DETAIL



(NOT TO SCALE)

FOR BILL OF MATERIALS

6" TILE LINE PLASTIC	766 L.F.
CRUSHED STONE	40 TONS
6" STEEL OUTLET PIPE	46 L.F.
RODENT GUARDS	2 NO.
BLINDING MATERIAL	

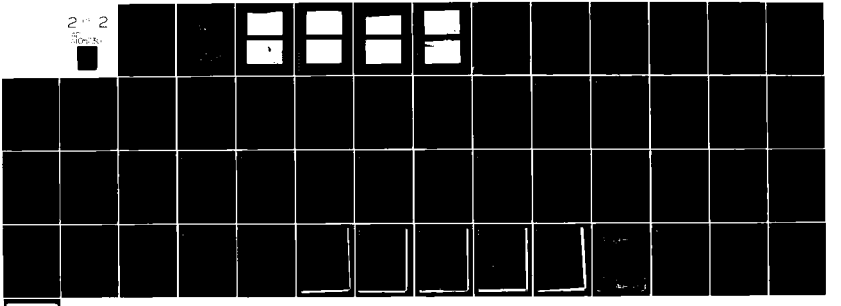
THE CIRCUMFERENCE OF THE PIPE SHALL BE TIGHTLY ATTACHED

CONEWANGO CREEK WATERSHED PROJECT
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY NEW YORK
TILE DRAINAGE EMERGENCY SPILLWAY

U.S. DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

5/22/74
AS BUILT

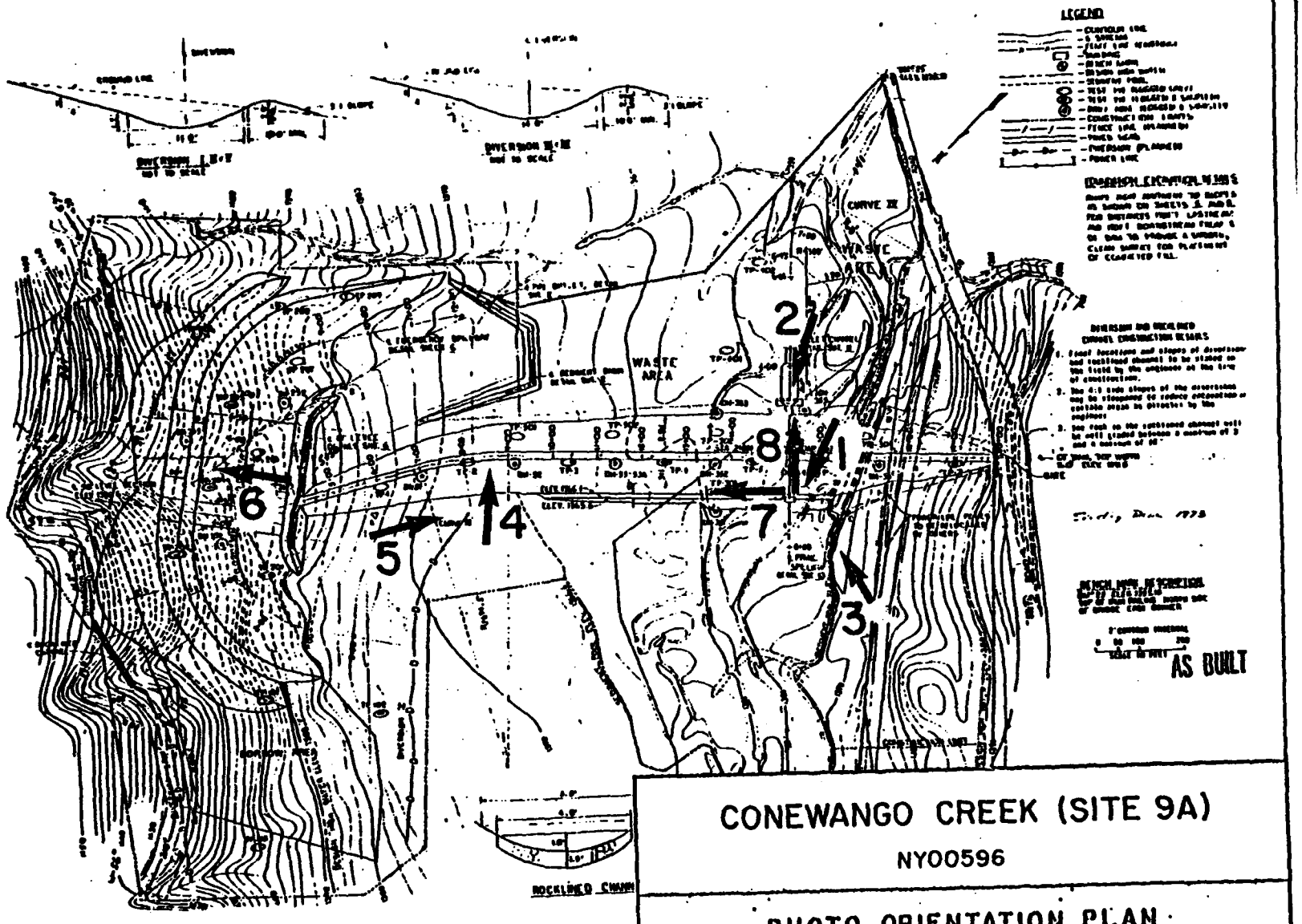
AD-A105 730 ERDMAN ANTHONY ASSOCIATES ROCHESTER NY F/G 13/13
NATIONAL DAM SAFETY PROGRAM. CONEWANGO CREEK WATERSHED DAM NUMB--ETC(U)
AUG 81 R J FARRELL DACW51-81-C-0017
UNCLASSIFIED NL



END
DATE FILMED
11-81
DTIC

APPENDIX C

PHOTOGRAPHS



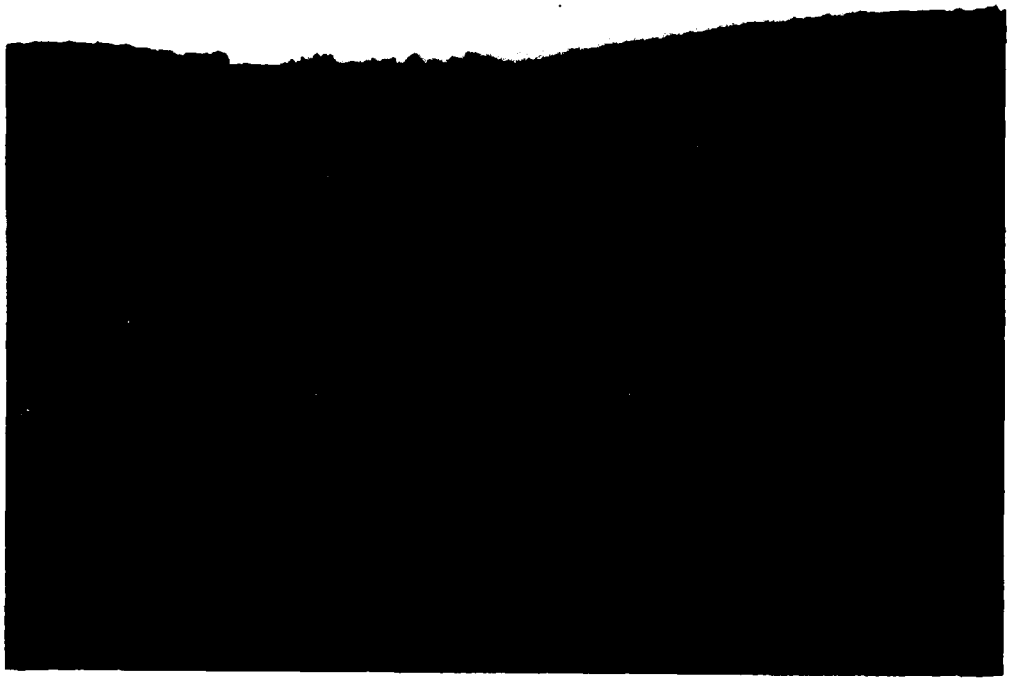
CONEWANGO CREEK (SITE 9A)

NY00596

PHOTO ORIENTATION PLAN

BROWN, ANTHONY, ASSOCIATES CONSULTING ENGINEERS & PLANNERS	DATE MAY 1981	

C-1

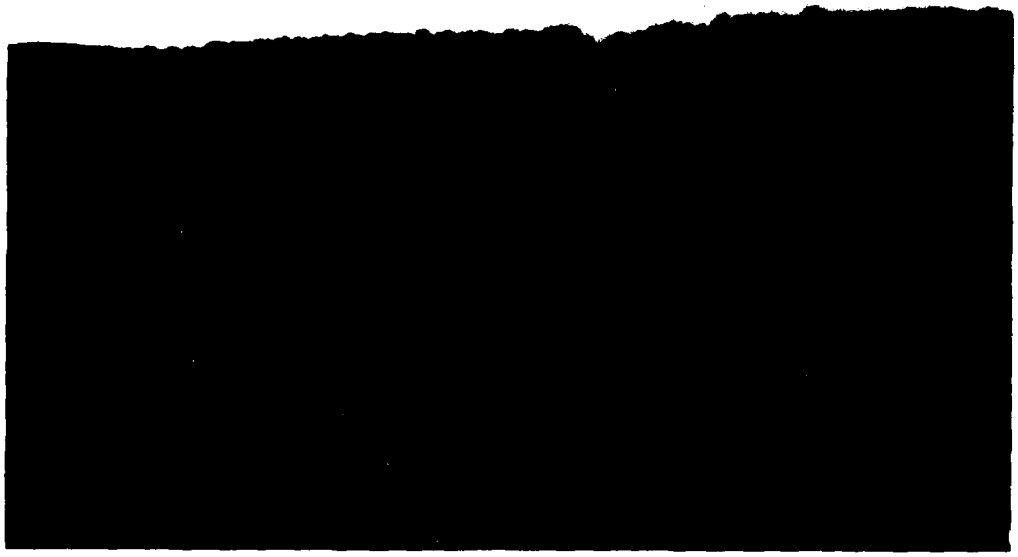


1. Principal spillway inlet structure. Note slide gate stem and lack of access to the top of structure.

2. Principal spillway impact basin

3. Principal spillway inlet structure, showing low stage inlet and trash rack.

4. Upstream slope of dam. Note rutting due to vehicular traffic.



5. Upstream slope of dam. Note debris at recent high water level.

6. Spring in north slope of emergency spillway

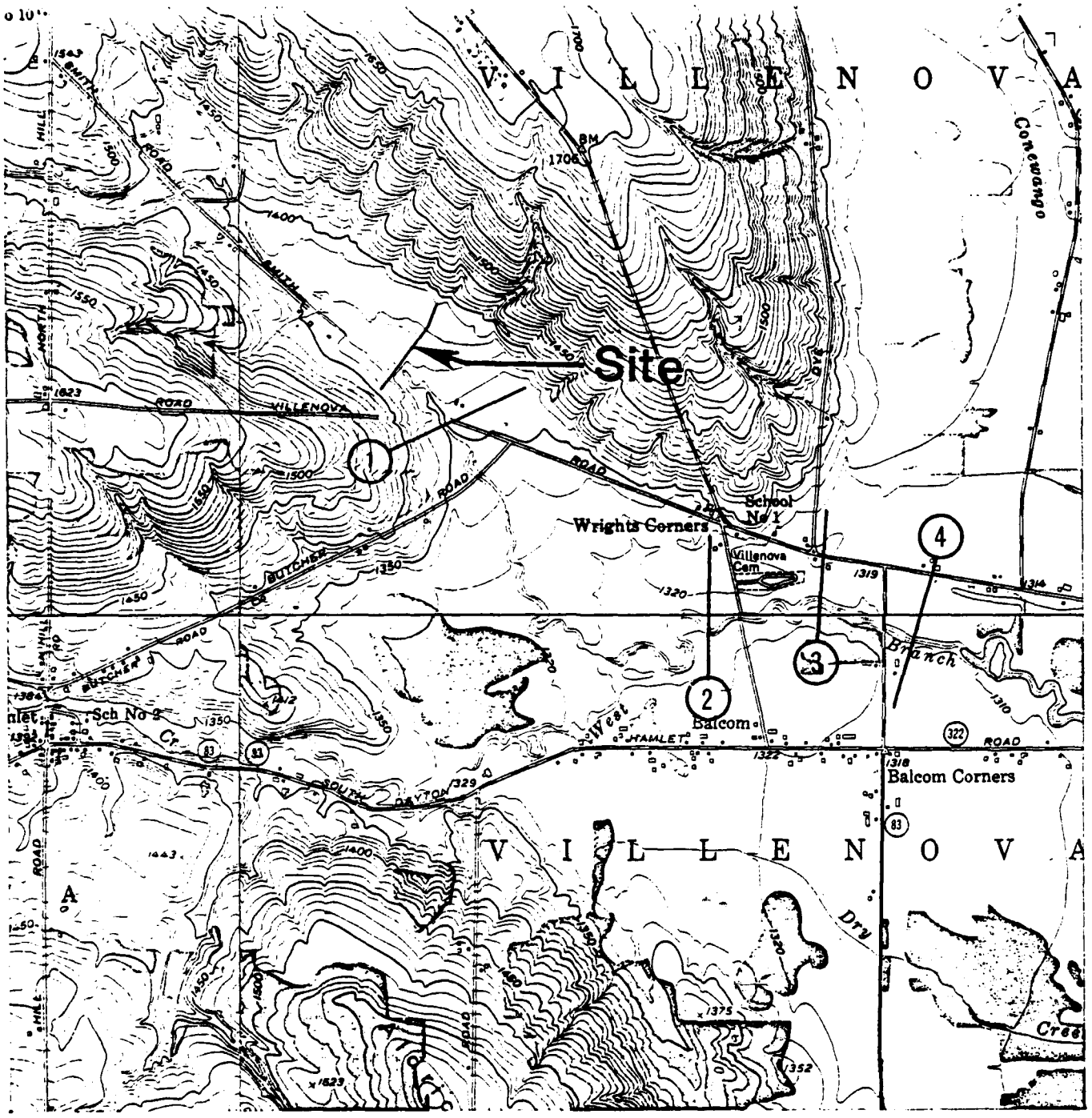
7. Upstream slope of dam. Note wave erosion.

8. Downstream channel. Note minor erosion on right bank of channel.

APPENDIX D

HYDRAULIC AND HYDROLOGIC COMPUTATIONS

APPENDIX D



Conewango Creek Watershed
(Site 9A)

CROSS SECTION LOCATION PLAN

Scale: 1"=2000' D-2

```
A1       ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF                DAM NY 596
A2       HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFTEY OF CONEWANGO CREEK-SITE 9A
A3       RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM
B    100         0       15                                      0      -1       9
B1     5
J      1         6        1
J1   0.2       0.4      0.5      0.6      0.8      1.0
K        0  INFLOW                                                1
K1       CALCULATION OF INFLOW HYDROGRAPH
M      1         1      6.0                12.17        0                        1
P      0      22.6      114       124       138       148
T                                                              1.0      0.1
W   4.08      0.63
X    2.0      -.10      2.0
K        1 OUTFLOW                                             1
K1       COMPUTE OUTFLOW HYDROGRAPH FROM DAM NY596
Y                                    1         1
Y1     1                                                  -1366.6       -1
Y4  1381      1382      1383      1384      1385      1387      1388      1389      1390      1391
Y4 1391.8     1392
Y5   118       285       356       467       473       640      1522      2844      4489      6453
Y5  8200      8650
$S  40.6     415.8     611.9     746.2     964.2
$E 1366.6     1381    1386.6    1388.7    1391.8
$$ 1386.6
$D 1391.8       2.7       1.5      1590
K        1         1                                             1
K1     CHANNEL ROUTING -MOD PULS REACH 0-1
Y                                    1         1
Y1     1
Y6 0.045      0.04      .045      1346      1360       670    0.0116
Y7       0      1360       700      1355      1370      1352      1395      1346      1420      1346
Y7  1430      1352      1700      1360      1701      1360
K        0  INFLOW
K1         COMPUTE RUNOFF FROM ADJACENT WATERSHED
M      1         1      6.17               12.17         0
P      0      22.6      114       124       138       148
T                                                              1.0      0.1
W   3.96      0.63
X      2.      -0.1        2.
K        2 COMBINE
K1       COMBINE HYDROGRAPHS
K        1         2
K1     CHANNEL ROUTING -MOD PULS REACH 1-2
Y                                    1         1
Y1     1
Y6 0.045      0.04     0.045      1308      1330      7600    0.0005
Y7       0      1330       700      1320      1300      1314      1340      1308      1370      1308
Y7  1400      1314      2200      1320      2201      1320
K        1         3                                             1
K1     CHANNEL ROUTING -MOD PULS REACH 2-3
Y                                    1         1
Y1     1
Y6 0.045      0.04     0.045      1304      1322      1800    0.0022
Y7       0      1320       700      1322       880      1320      1320      1314      1330      1304
Y7  1370      1304      1380      1314      2200      1322
K        1         4
```

```
K1     CHANNEL ROUTING -MOD PULS REACH 3-4
Y                                      1       1
Y1       1
Y6  0.045     0.04    0.045    1302    1318    1500  0.0013
Y7       0    1315     1200    1312    1255    1302    1295    1302    1320    1312
Y7    1900    1315     2900    1318    3000    1318
K       99
A
```

```
OK, SEG #HEC1DB
ENTER PROJECT NUMBER
80166-00.09
INPUT FILE ? NY596
1*********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 *********************************
1                              PREVIEW OF SEQUENCE OF STREAM NETWORK CALCULATIONS
                                       RUNOFF HYDROGRAPH AT       INFLOW
                                       ROUTE HYDROGRAPH TO        UTFLOW
                                       ROUTE HYDROGRAPH TO             1
                                       RUNOFF HYDROGRAPH AT       INFLOW
                                       COMBINE  2 HYDROGRAPHS AT OMBINE
                                       ROUTE HYDROGRAPH TO             2
                                       ROUTE HYDROGRAPH TO             3
                                       ROUTE HYDROGRAPH TO             4
                                       END OF NETWORK.

1*********************************
 FLOOD HYDROGRAPH PACKAGE (HEC-1)
 DAM SAFETY VERSION      JULY 1978
   LAST MODIFICATION  26 FEB 79
 *********************************

 RUN  DATE: 6/10/
      TIME: 8:55 AM

                    ANALYSIS OF DAM OVERTOPPING USING RATIOS OF PMF                DAM NY 596
                    HYDROLOGIC-HYDRAULIC ANALYSIS OF SAFTEY OF CONEWANGO CREEK-SITE 9A
                    RATIOS OF PMF ROUTED THROUGH THE RESERVOIR AND DOWNSTREAM

                                          JOB SPECIFICATION
          NQ      NHR     NMIN     IDAY      IHR     IMIN    METRC     IPLT     IPRT    NSTAN
         100        0       15        0        0        0        0       -1        4        0
                                   JOPER      NWT   LROPT    TRACE
                                       5        0        0        0


                                MULTI-PLAN ANALYSES TO BE PERFORMED
                                     NPLAN= 1 NRTIO= 6 LRTIO= 1
                   RTIOS=    0.20    0.40    0.50    0.60    0.80    1.00


**********          **********          **********          **********          **********

                                      SUB-AREA RUNOFF COMPUTATION

                        CALCULATION OF INFLOW HYDROGRAPH
                                ISTAQ   ICOMP   IECON   ITAPE    JPLT    JPRT   INAME  ISTAGE   IAUTO
                               INFLOW       0       0       0       0       0       1       0       0

                                                HYDROGRAPH DATA
                    IHYDG    IUHG    TAREA    SNAP   TRSDA   TRSPC   RATIO   ISNOW   ISAME   LOCAL
```

OK, SEG #HEC1DB

1	1	6.00	0.00	12.17	0.00	0.000	0	1	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.60	114.00	124.00	138.00	148.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.807

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 4.08 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= 2.00 QRCSN= -0.10 RTIOR= 2.00

UNIT HYDROGRAPH 89 END-OF-PERIOD ORDINATES, LAG= 4.09 HOURS, CP= 0.64 VOL= 1.00

9.	35.	73.	117.	166.	218.	273.	330.	388.	445.
496.	537.	571.	596.	613.	621.	619.	603.	571.	534.
499.	467.	436.	408.	381.	356.	333.	312.	291.	272.
255.	238.	222.	208.	194.	182.	170.	159.	149.	139.
130.	121.	113.	106.	99.	93.	87.	81.	76.	71.
66.	62.	58.	54.	51.	47.	44.	41.	39.	36.
34.	32.	30.	28.	26.	24.	23.	21.	20.	18.
17.	16.	15.	14.	13.	12.	11.	11.	10.	9.
9.	8.	8.	7.	7.	6.	6.	5.	5.	

END-OF-PERIOD FLOW

0 MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	CCMP Q
									SUM	26.99	23.23	3.76	290432.
										(685.)(590.)(95.)(8224.11)			

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

COMPUTE OUTFLOW HYDROGRAPH FROM DAM NY596

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
OUTFLOW	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTOL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	-1367.	-1

STAGE	1381.00	1382.00	1383.00	1384.00	1385.00	1387.00	1388.00	1389.00	1390.00	1391.00
	1391.80	1392.00								
FLOW	118.00	205.00	356.00	467.00	473.00	640.00	1522.00	2844.00	4489.00	6453.00
	8200.00	8650.00								
CAPACITY=		41.	416.	612.	746.	964.				

ELEVATION= 1367. 1381. 1387. 1389. 1392.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXFL
1386.6	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
1391.8	2.7	1.5	1590.

PEAK OUTFLOW IS 1442. AT TIME 46.00 HOURS

PEAK OUTFLOW IS 4010. AT TIME 44.25 HOURS

PEAK OUTFLOW IS 5116. AT TIME 44.00 HOURS

PEAK OUTFLOW IS 6167. AT TIME 44.00 HOURS

PEAK OUTFLOW IS 8259. AT TIME 43.75 HOURS

PEAK OUTFLOW IS 10423. AT TIME 43.75 HOURS

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 0-1

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
1	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0450	0.0400	0.0450	1346.0	1360.0	670.	0.01160

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1360.00 700.00 1355.00 1370.00 1352.00 1395.00 1346.00 1420.00 1346.00
1430.00 1352.00 1780.00 1360.00 1701.00 1360.00

STORAGE	0.00	0.31	0.66	1.07	1.52	2.03	2.58	3.18	3.83	5.29
	8.89	14.63	22.51	32.33	43.62	56.35	70.54	86.18	103.27	121.81
OUTFLOW	0.00	61.82	202.41	411.60	688.91	1036.16	1456.09	1951.85	2526.78	3375.65
	4831.06	7216.05	10819.22	16083.62	22936.79	31422.70	41652.64	53738.30	67790.06	83916.67

STAGE	1346.00	1346.74	1347.47	1348.21	1348.95	1349.68	1350.42	1351.16	1351.89	1352.63
	1353.37	1354.10	1354.84	1355.58	1356.32	1357.05	1357.79	1358.53	1359.26	1360.00
FLOW	0.00	61.82	282.41	411.60	688.91	1036.16	1456.09	1951.85	2526.78	3379.65
	4831.86	7216.05	10819.22	16083.62	22936.79	31422.70	41652.64	53738.30	67798.06	83916.67

MAXIMUM STAGE IS 1350.4

MAXIMUM STAGE IS 1353.0

MAXIMUM STAGE IS 1353.5

MAXIMUM STAGE IS 1353.8

MAXIMUM STAGE IS 1354.3

MAXIMUM STAGE IS 1354.8

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

COMPUTE RUNOFF FROM ADJACENT WATERSHED

	ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
INFLOW	0	0	0	0	0	0	0	0	

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	6.17	0.00	12.17	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.60	114.00	124.00	138.00	148.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS 0.807

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	0.10	0.00	0.00

UNIT HYDROGRAPH DATA

TP= 3.96 CP=0.63 NTA= 0

RECESSION DATA

STRTQ= 2.00 QRCSN= -0.10 RTIOR= 2.00

UNIT HYDROGRAPH 86 END-OF-PERIOD ORDINATES, LAG= 3.95 HOURS, CP= 0.63 VOL= 1.00

10.	39.	79.	127.	181.	238.	297.	359.	423.	483.
535.	578.	611.	636.	651.	655.	648.	623.	585.	546.
509.	475.	443.	414.	386.	360.	336.	314.	293.	273.
255.	238.	222.	207.	193.	180.	168.	157.	146.	137.
128.	119.	111.	104.	97.	90.	84.	79.	73.	68.
64.	60.	56.	52.	48.	45.	42.	39.	37.	34.
32.	30.	28.	26.	24.	23.	21.	20.	18.	17.
16.	15.	14.	13.	12.	11.	11.	10.	9.	9.
8.	7.	7.	7.	6.	6.				

OK, SEG #HEC1DB

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
									SUM	26.99	23.23	3.76	202347.
										(685.)(590.)(95.)(8561.51)			

********** ********** ********** ********** **********

COMBINE HYDROGRAPHS

COMBINE HYDROGRAPHS	ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAPE	ISTAGE	IAUTO
	OMBINE	2	0	0	0	0	0	0	0

********** ********** ********** ********** **********

HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 1-2

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAPE	ISTAGE	IAUTO
2	1	0	0	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0450	0.0400	0.0450	1308.0	1330.0	7600.	0.00050

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1330.00 700.00 1320.00 1300.00 1314.00 1340.00 1308.00 1370.00 1308.00
1400.00 1314.00 2200.00 1320.00 2201.00 1320.00

STORAGE	0.00	7.42	17.58	30.46	46.06	64.40	102.78	194.86	341.51	541.71
	798.49	1101.25	1423.02	1761.14	2115.64	2486.51	2873.75	3277.35	3697.33	4133.67
OUTFLOW	0.00	34.81	122.06	264.55	468.78	741.57	1195.01	2036.15	3474.30	5687.63
	8833.60	13411.18	19284.59	26214.89	34194.46	43224.27	53310.59	64463.27	76694.53	90018.39
STAGE	1308.00	1309.16	1310.32	1311.47	1312.63	1313.79	1314.95	1316.10	1317.26	1318.42
	1319.58	1320.73	1321.89	1323.05	1324.21	1325.37	1326.52	1327.68	1328.84	1330.00
FLOW	0.00	34.81	122.06	264.55	468.78	741.57	1195.01	2036.15	3474.30	5687.63
	8833.60	13411.18	19284.59	26214.89	34194.46	43224.27	53310.59	64463.27	76694.53	90018.39

MAXIMUM STAGE IS 1316.7

MAXIMUM STAGE IS 1319.1

MAXIMUM STAGE IS 1319.8

MAXIMUM STAGE IS 1320.3

MAXIMUM STAGE IS 1321.3

MAXIMUM STAGE IS 1322.1

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HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 2-3

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0450	0.0400	0.0450	1304.0	1322.0	1800.	0.00220

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1320.00 700.00 1322.00 880.00 1320.00 1320.00 1314.00 1330.00 1304.00
1370.00 1304.00 1380.00 1314.00 2200.00 1322.00

STORAGE	0.00	1.60	3.28	5.03	6.86	8.76	10.73	12.78	14.90	17.09
	19.37	22.34	30.84	45.86	67.40	95.46	130.03	171.21	227.11	303.13
OUTFLOW	0.00	64.04	204.00	402.51	652.86	951.26	1295.30	1683.33	2114.23	2587.25
	3101.86	2742.33	2750.56	3683.55	5422.09	8049.00	11681.41	16538.40	23626.22	32814.54
STAGE	1304.00	1304.95	1305.89	1306.84	1307.79	1308.74	1309.68	1310.63	1311.58	1312.53
	1313.47	1314.42	1315.37	1316.31	1317.26	1318.21	1319.16	1320.10	1321.05	1322.00
FLOW	0.00	64.04	204.00	402.51	652.86	951.26	1295.30	1683.33	2114.23	2587.25
	3101.86	2742.33	2750.56	3683.55	5422.09	8049.00	11681.41	16538.40	23626.22	32814.54

MAXIMUM STAGE IS 1312.9

MAXIMUM STAGE IS 1318.0

MAXIMUM STAGE IS 1318.6

MAXIMUM STAGE IS 1319.2

MAXIMUM STAGE IS 1320.0

MAXIMUM STAGE IS 1320.6

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HYDROGRAPH ROUTING

CHANNEL ROUTING -MOD PULS REACH 3-4

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	0	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

D-11

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
0.0450	0.0400	0.0450	1302.0	1318.0	1500.	0.00130

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 1315.00 1200.00 1312.00 1255.00 1302.00 1295.00 1302.00 1320.00 1312.00
1900.00 1315.00 2900.00 1318.00 3000.00 1318.00

STORAGE	0.00	1.26	2.71	4.36	6.20	8.24	10.47	12.90	15.53	18.35
	21.36	24.58	28.09	40.61	67.62	109.11	164.09	227.82	299.69	375.70
OUTFLOW	0.00	41.98	138.07	281.52	471.35	708.16	993.19	1327.99	1714.31	2154.00
	2648.97	3281.16	3079.56	2419.25	3676.99	6239.80	11044.67	18057.04	26789.14	37336.26
STAGE	1302.00	1302.84	1303.68	1304.53	1305.37	1306.21	1307.05	1307.89	1308.74	1309.58
	1310.42	1311.26	1312.10	1312.95	1313.79	1314.63	1315.47	1316.31	1317.16	1318.00
FLOW	0.00	41.98	138.07	281.52	471.35	708.16	993.19	1327.99	1714.31	2154.00
	2648.97	3281.16	3079.56	2419.25	3676.99	6239.80	11044.67	18057.04	26789.14	37336.26

MAXIMUM STAGE IS 1310.6

MAXIMUM STAGE IS 1314.8

MAXIMUM STAGE IS 1315.2

MAXIMUM STAGE IS 1315.6

MAXIMUM STAGE IS 1316.1

MAXIMUM STAGE IS 1316.6

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1

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 0.20	RATIO 2 0.40	RATIO 3 0.50	RATIO 4 0.60	RATIO 5 0.80	RATIO 6 1.00
HYDROGRAPH AT	INFLOW	6.00	1	2090.	4179.	5224.	6269.	8359.	10448.
		(15.54)		(59.17)(	118.35)(	147.93)(	177.52)(	236.69)(	295.87)(
ROUTED TO	UTFLOW	6.00	1	1442.	4010.	5116.	6167.	8259.	10423.
		(15.54)		(40.82)(	113.55)(	144.86)(	174.62)(	233.86)(	295.13)(
ROUTED TO	1	6.00	1	1447.	4013.	5116.	6167.	8261.	10430.
		(15.54)		(40.97)(	113.63)(	144.86)(	174.63)(	233.93)(	295.34)(
HYDROGRAPH AT	INFLOW	6.17	1	2187.	4373.	5467.	6560.	8747.	10933.
		(15.98)		(61.92)(	123.84)(	154.80)(	185.76)(	247.68)(	309.55)(
2 COMBINED	OMBINE	12.17	1	3025.	8231.	10490.	12645.	16922.	21337.
		(31.52)		(85.66)(	233.08)(	297.05)(	358.07)(	479.18)(	604.18)(
ROUTED TO	2	12.17	1	2788.	7451.	9678.	11866.	16222.	20599.
		(31.52)		(78.96)(	210.99)(	274.06)(	336.02)(	459.36)(	583.30)(
ROUTED TO	3	12.17	1	2787.	7449.	9676.	11854.	16219.	20685.
		(31.52)		(78.92)(	210.94)(	274.01)(	335.68)(	459.26)(	583.46)(
ROUTED TO	4	12.17	1	2785.	7435.	9654.	11856.	16215.	20577.
		(31.52)		(78.87)(	210.54)(	273.38)(	335.72)(	459.15)(	582.67)(

1 SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 .....

	INITIAL VALUE	SPILLWAY CREST	TOP OF DAM
ELEVATION	1366.60	1386.60	1391.80
STORAGE	41.	612.	964.
OUTFLOW	118.	607.	8200.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
0.20	1387.91	0.00	696.	1442.	0.00	46.00	0.00

0.40	1389.71	0.00	817.	4010.	0.00	44.25	0.00
0.50	1390.32	0.00	860.	5116.	0.00	44.00	0.00
0.60	1390.85	0.00	898.	6167.	0.00	44.00	0.00
0.80	1391.82	0.02	966.	8259.	0.50	43.75	0.00
1.00	1392.24	0.44	995.	10423.	3.50	43.75	0.00

PLAN 1 STATION 1

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	1447.	1350.4	46.00
0.40	4013.	1353.0	44.25
0.50	5116.	1353.5	44.00
0.60	6167.	1353.8	44.00
0.80	8261.	1354.3	44.00
1.00	10430.	1354.8	43.75

PLAN 1 STATION 2

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	2788.	1316.7	46.25
0.40	7451.	1319.1	45.00
0.50	9678.	1319.8	44.75
0.60	11866.	1320.3	44.50
0.80	16222.	1321.3	44.25
1.00	20599.	1322.1	44.25

PLAN 1 STATION 3

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	2787.	1312.9	46.25
0.40	7449.	1318.0	45.00
0.50	9676.	1318.6	44.75
0.60	11854.	1319.2	44.50
0.80	16219.	1320.0	44.50
1.00	20605.	1320.6	44.25

PLAN 1 STATION 4

RATIO	MAXIMUM FLOW,CFS	MAXIMUM STAGE,FT	TIME HOURS
0.20	2785.	1310.6	46.50
0.40	7435.	1314.8	45.25
0.50	9654.	1315.2	45.00
0.60	11856.	1315.6	44.75
0.80	16215.	1316.1	44.50
1.00	20577.	1316.6	44.25

1**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION JULY 1978
LAST MODIFICATION 26 FEB 79

BY B.R. DATE 4/24/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 1 OF 16
CD JRH DATE 5/28/81 SUBJECT Dam 596 HYDROLOGY SUB-SHEET NO. 1
OWNER PROJECT NAME Dam Inspection 80166-00.09

WATERSHED UPSTREAM OF DAM

$$T_p = C_t (L L_{ca})^{0.3} \checkmark$$

$$T_r = \frac{T_p}{5.5} \checkmark$$

$C_t = 2.00$

$C_p = 0.63$

$$T_{PR} = T_p + 0.25 (T_R - T_r)$$

$L = 25\,000' \checkmark = \frac{25000}{5280} = 4.73$ MI ✓

$L_{ca} = 11300' \checkmark = \frac{11300}{5280} = 2.14$ MI ✓

$T_p = 2 (4.73 \times 2.14)^{.3} = 4.01$ hr. ✓

$T_r = \frac{4.01}{5.5} = 0.73$ hr ✓ $\Rightarrow$ $T_R = 1$ hr ✓

$T_{PR} = 4.01 + 0.25(1 - 0.73) = 4.08$ hr. ✓

D.L.P DATE 3/27/81 **ERDMAN, ANTHONY, ASSOCIATES** SHEET 2 OF 16

CKD B.R. DATE 4/27/81 SUBJECT CAMP'S HYDROLOGY SUB-SHEET NO. 2

OWNER PROJECT NAME HE-1 DAM INSPECTION 80166-00.09

WATERSHED UPSTREAM OF DAM

CAMP DAM Idlewands Creek Site 9A Ref. Quad. Perrysburg, N.Y.
Forestville, N.Y.

Distance L & Lca Meas. with Map Meas. Wheel (1" = 2000')

Computation for L Distance

Run		Meas. Dist	Avg. Dist	Coef.	L Distance
A	1 =	12.50			
	2 =	12.50			
		25.00 ÷ 2	= 12.50	× 2000'	= 25,000. FT. *
Run					
B	1 =	8.6			
	2 =	8.7			
		17.3 ÷ 2	= 8.65	× 2000'	= 173,000 FT

Computation for Lca Distance

Run		Meas. Dist	Avg. Dist.	Coef.	Lca Distance
A	1 =	5.6			
	2 =	5.7			
		11.3 ÷ 2	= 5.65	× 2000'	= 11300. FT. *

Summary

* Use Run A for L Distance = 25,000. Ft.

* Use Run A for Lca Distance = 11300. Ft

ADJACENT WATERSHED

$L = 27000 \text{ ft} \checkmark = \frac{27000}{5280} = 5.11 \text{ MI} \checkmark$

$L_{ca} = 9500 \text{ ft} \checkmark = \frac{9500}{5280} = 1.80 \text{ MI} \checkmark$

$T_p = C_T (L \times L_{ca})^{0.3}$ $\quad C_T = 2.00$

$C_p = 0.63$

$T_p = 2 (5.11 \times 1.80)^{0.3}$

$T_p = 3.89 \text{ hr.} \checkmark$

$T_r = \frac{T_p}{5.5}$

$T_r = \frac{3.89}{5.5} = 0.71 \Longrightarrow T_R = 1 \text{ hr} \checkmark$

$T_{PR} = T_p + 0.25 (T_R - T_r)$

$T_{PR} = 3.89 + 0.25 (1 - 0.71) = 3.96 \text{ hr.} \checkmark$

ADJACENT WATERSHED

LAM 596 JONEWANGO CREEK SITE 9A

REFF. QUAD HAMLET, NY
CHERRY CR., NY
FORESTVILLE, NY
PERRYSBURG, NY.

LEANAGE DISTANCE
DISTANCE L & LCA MEAS. WITH MAP MEAS. WHEEL (1" = 2000')

COMPUTATIONS FOR L DISTANCE

RUN	MEAS. DIST	AVG. DIST	COEF.	L DIST.
A 1	13.5			
2	13.5			
	27.0	÷ 2 = 13.5	× 2000'	= 27,000 ft. ★

RUN
B 1 = 12.6
2 = 12.7
25.2 ÷ 2 = 12.65 × 2000 = 25,300 ft

★ L = 27,000ft. USED RUN A

COMPUTATION FOR Lca DISTANCE

RUN	MEAS. DIST.	AVG DIST	COEF.	Lca DIST.
A 1	= 4.8			
2	4.7			
	9.5	÷ 2 = 4.75	× 2000'	= 9,500 ft. ★

★ Lca = 9,500 ft.

Dam 596 HYDRAULICS

SERVICE SPILLWAY

18" ϕ RCP ✓ w/ 4' x 12' Riser ✓

From design report:

Q_S = 481 cfs @ Elev. 1386.6 ✓

Q_S = 467 cfs @ Elev. 1384 ✓

① $Q_S = C_o A_o \sqrt{2g h_o} + 467$ cfs, h_o is Elevs. above Elev. 1384

$A_o = \left[\left(\frac{4B}{12}\right)^2 / 4\right]\pi = 12.57$ ft^2 ✓

Determine C_o from $Q = 481 - 467$ and $h_o = 1386.6 - 1384$

$Q = 14$ cfs $h_o = 2.6'$

From eqn ①

$$C_o = \frac{14}{12.57\sqrt{2 \times 32.2 \times 2.6}} = 0.09$$

Note: Equation ① is only for elevations above elevation 1384. For elevations below 1384 flow is given in design report D-18

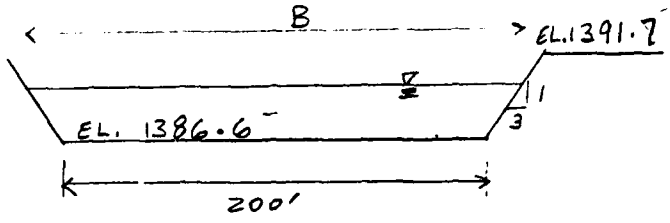
$$Q_s = 0.09 \times 12.57\sqrt{2 \times 32.2 \times h} + 467 = 9.08\ h_o^{0.5} + 467 \text{ cfs}$$ ✓

The above formula is used only for elevations above 1394'.

	SERVICE SPILLWAY		
	ELEV.	h_o	Q_s
FROM DESIGN REPORT	1381		118 ✓
	1382		205 ✓
	1383		356 ✓
	1383.5		446
	1384	0	467 ✓
	1386.6	2.6	481 ✓
	1387	3	483 ✓
	1388	4	485 ✓
	1389	5	487 ✓
	1390	6	489 ✓
	1391	7	491 ✓
*	1391.8	7.8	492 ✓
	1392	8	493 ✓
	1393	9	494 ✓
	1394	10	

* Top of dam

EMERGENCY SPILLWAY



EMERGENCY SPILLWAY SECTION

$S_o = 0.03$

$$Q_c = \sqrt{\frac{g A^3}{B}}$$

for $y = 1'$

$B = (2 \times 3) + 200 = 206'$

$A = \frac{1}{2}(206 + 200) \times 1 = 203 \text{ ft}^2$

$$Q_c = \sqrt{\frac{32.2 \times 203^3}{206}} = 1143.5 \text{ cfs}$$

$$K = \frac{1.49}{n} AR^{2/3} = \frac{1.49}{0.035} 203 \left[\frac{203}{200 + 2(1+9)^{0.5}}\right]^{2/3}$$

$K = 8549$

$$S_c = \left(\frac{1143.5}{8549}\right)^2 = 0.018$$

spillway slope > critical slope $(0.03 > 0.013)$

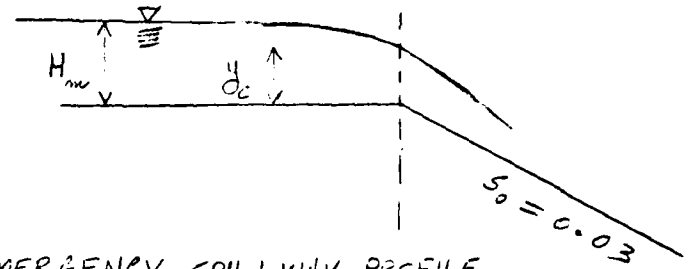
∴ Flow goes through critical depth for $y = 1'$ and also for $y > 1'$

use Table 5-7 from "King and Brater"

$Z = 3/1 = 3$

$b = 200'$

$Q_E = C_2 \, b \, H_m^{1.5}$



EMERGENCY SPILLWAY PROFILE

EMERGENCY SPILLWAY
DISCHARGE – ELEVATION RELATIONSHIP

	H_m	$\frac{H_m Z}{b}$	C_2	Q_E	ELEV.
	0	0	3.09	0	1386.6
	0.4	0.01	3.11	157	1387
	1.4	0.02	3.13	1037	1388
	2.4	0.04	3.17	2357	1389
	3.4	0.05	3.19	4000	1390
	4.4	0.07	3.23	5962	1391
*	5.2	0.08	3.25	7708	1391.3
	5.4	0.08	3.25	8157	1392
	6.4	0.10	3.29	10654	1393
	7.4	0.11	3.32	13366	1394

* actual top of dam.

LONGWANGO CREEK DAM 596 SITE 9A

C.L. & AREA RESEVIOR SURFACE AREA

REFF. U.S. DEPT. OF A.S.C.S. AS BUILT PLANS DWG. NY-2161-P
SCALE 1" = 200' PLAN x 1/2 REDUCTION = 1" = 400

Eq. $in^2 \times \frac{400^2 ft^2}{in^2} \times \frac{1 AC}{43,560 ft^2} = AC$

ELEV. 1370

$4.6\ in^2 \times \frac{400^2 ft^2}{in^2} \times \frac{1 AC}{43,560 ft^2} = 16.90$ AC. ✓

ELEV. 1375

$8.28\ in^2 \times \frac{400^2 ft^2}{in^2} \times \frac{1 AC}{43560 ft^2} =$ 30.41 AC. ✓

ELEV. 1380

$12.10\ in^2 \times \frac{400^2 ft^2}{in^2} \times \frac{1 AC}{43,560 ft^2} =$ 44.44 AC. ✓

ELEV. 1385

$16.67\ in^2 \times \frac{400^2 ft^2}{in^2} \times \frac{1 AC}{43,560 ft^2} =$ 51.23 AC. ✓

ELEV. 1390

$19.66\ in^2 \times \frac{400^2 ft^2}{in^2} \times \frac{1 AC}{43,560 ft^2} =$ 72.21 Ac. ✓

ELEV. 1395

$24.0\ in^2 \times \frac{400^2 ft^2}{in^2} \times \frac{1 AC}{43,560 ft^2} =$ 88.15 AC ✓

TOTAL AC = 303.34

* Used storage values from design report D-22

BY B.R. DATE 4/29/81 ERDMAN, ANTHONY, ASSOCIATES SHEET 10 OF 16

CHD DATE SUBJECT DAM 596 HYDRAULICS SUB-SHEET NO. 6

OWNER PROJECT NAME DAM INSPECTION 80166-00.09

$Q_S + Q_E$ TOTAL SPILLWAYS DISCHARGE

ELEV. ft	$Q_S + Q_E$ (cfs)	RESERVOIR SURFACE AREA
1366.6	0	8.8
1367	2.5	
1367.5	8.5	
1368	16.4	
1368.77	32	
1370	49	16.90 AC.
1375	87	30.41 AC.
1379	113	
1380 1381	118 116	44 AC
1382	205	
1383	356	
1383.5	446	
1384	467 413	51.23 AC
1386.6	481	59.5 AC.
1387	640	
1388	1522	
1389	2844 1709	65.5
1390	4489	72.21 AC
1391	6453	
* 1391.8	8200	74.5 AC
1392	8650	
1393	11147 (est)	
1394		
1395		88.15 AC

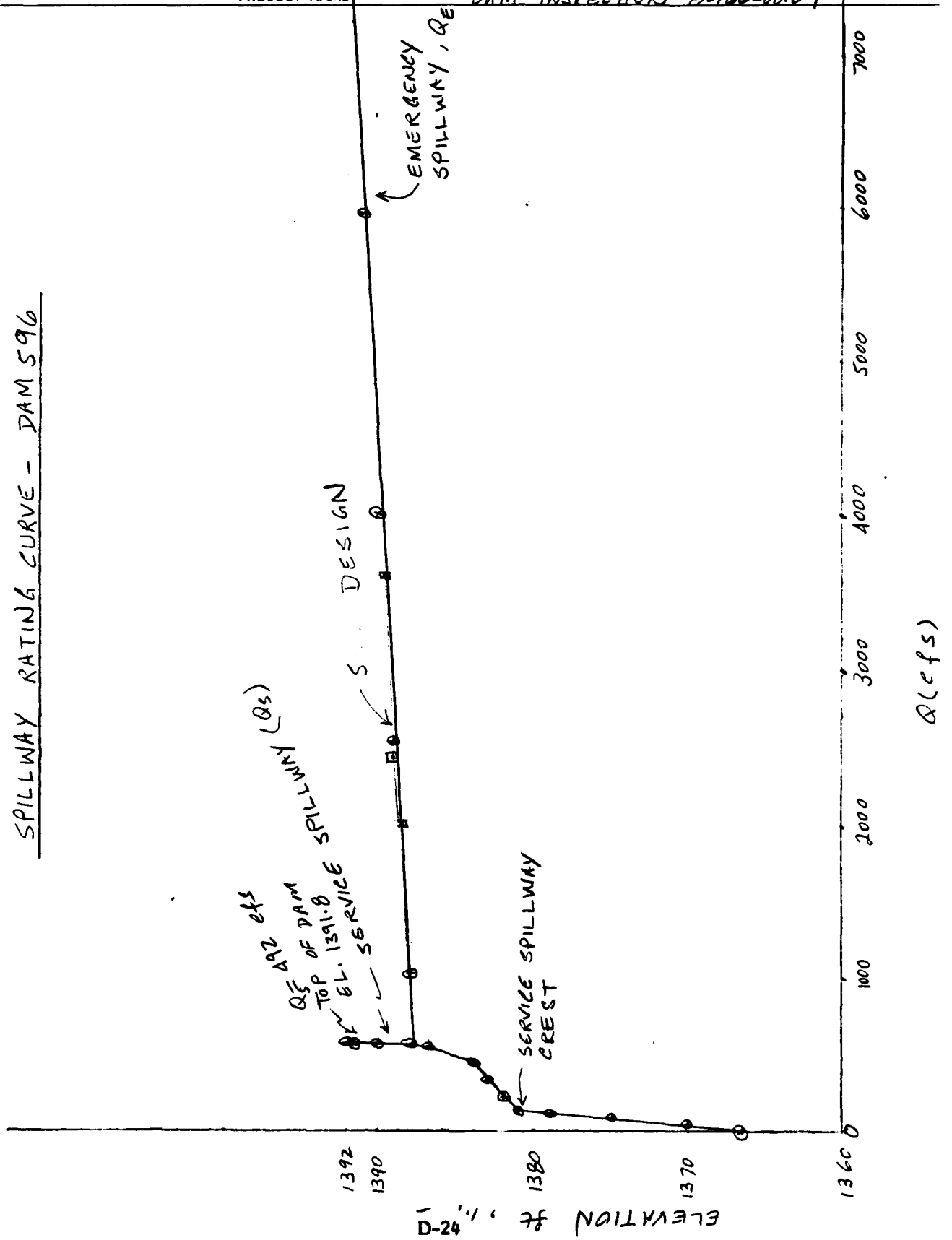
* TOP OF DAM

BY B.R. DATE 4/27/81 **ERDMAN, ANTHONY, ASSOCIATES** SHEET 11 OF 16

CHD DATE SUBJECT DAM 596 HYDRAULICS SUB-SHEET NO. 7

OWNER PROJECT NAME DAM INSPECTION B0166-00.09

SPILLWAY RATING CURVE - DAM 596



VALUES ON $D CARD OF HEC-1

FIELD	VARIABLE	VALUE
0	ID	$D
1	TOPEL	1391.8 ✓
2	CQQD	2.7 ✓
3	EXPD	1.5 ✓
4	DAMWID	1590 ✓

AREA OF THE ADJACENT WATERSHED

$A = 43.0\ IN^2$ (scale : 1" = 2000')

$$A = 43\ IN^2 \times \frac{2000^2\ ft^2}{IN^2} \times \frac{ac}{43560\ ft^2} \times \frac{MILE^2}{640\ ac.} = 6.17\ Mile^2$$ ✓

Emergency Spillway Capacities

Flood	Q_I	Elev.	Q_{es}	A	V	Comments
1/2 PMF	6,403	1093.21	8756 ✓	1075	8.15	> 8.0 ∴ erosion
PMF	5,116	1090.32	4328	543	8.08	> 8.0 ∴ erosion

PMF

$y = 8157 + .28(10654 - 8157) = 8756$ cfs ✓

Assume $y_n/b < 0.02 \Rightarrow y_n = 0.76 \left(\frac{Q n}{b S_o^{1/2}}\right)^{0.6}$

$y_n = 0.76 \left(\frac{871 \times (0.03)}{200 \times (.03)^{1/2}}\right)^{0.6} = 4.03'$, $y_n/b = \frac{4.03}{200} = 0.02 \neq 0.02$ N.G.

Use Table 5.1 and Eq 5.20 from Chow's text Fundamentals of Open Channel Hydraulics by Isbey.

$$\frac{Q n}{b^{8/3} S_o^{1/2}} = \frac{8756 (0.06)}{(200)^{8/3} (0.03)^{1/2}} = 0.00222 \checkmark$$

0.00150	0.02
0.00222	y_n/b
0.00298	0.03

$$y_n/b = 0.02 + .01\left(\frac{.00072}{.00148}\right) = 0.025 \checkmark$$

$y_n = 0.025(200) = 5.0'$ ✓

$A = (5.0)(200) + \frac{1}{2}((\frac{1}{2})(5.0)(3)(5.0)) = 1075\ ft^2$ ✓

$V = \frac{Q}{A} = \frac{8756\ cfs}{1075\ ft^2} = 8.15\ ft/sec$ ✓

½ PMF

5962	4000	
.32	Y	$Y = 4000 + 0.32(5962 - 4000) = 4628$ ✓
4000	5962	

Assume $y_n/b < 0.02 \Rightarrow y_n = 0.759\left(\frac{Qn}{b S^{1/2}}\right)^{0.6}$

$y_n = 0.759\left(\frac{4628(0.02)}{200(0.02)^{1/2}}\right)^{0.6} = 2.75'$, $y_n/b = 2.75'/200' = 0.14 < 0.02$ OK ✓

$A = 2.75'(200') + \frac{1}{2}\left(\frac{1}{4}\right)(2.75')(3)(2.75') = 573\ ft^2$ ✓

$V = \frac{Q}{A} = \frac{4628}{573} = 8.08\ ft/sec$ ✓

CONEWANGO CREEK SITE 9A

REF. U.S. DEP. OF AGCS DESIGN REPORT SHEETS 4 RATING CURVE
SHEET 4 AREA SHEET

DAM TOP ELEV. 1391.8
DAM INV. ELEV. 1353.78

REACH 1 LENGTH = 670'

CROSS SECTION : $\frac{1360}{0}, \frac{1355}{700}, \frac{1352}{1370}, \frac{1346}{1395}, \frac{1346}{1420}, \frac{1352}{1430}, \frac{1360}{1700}, \frac{1360}{1701}$

SLOPE = (DAM INV. - RE. 1 INV.) ÷ REACH LENGTH

1353.8 - 1346 = 7.8 ÷ 670 = 0.0116

REACH 2 LENGTH = 7600'

CROSS SECTION : $\frac{1330}{0}, \frac{1320}{700}, \frac{1314}{1300}, \frac{1308}{1340}, \frac{1308}{1370}, \frac{1314}{1400}, \frac{1320}{2200}, \frac{1320}{2201}$

SLOPE = (1346 - 1308) ÷ 8200 = 0.0046
1600 = 0.005

REACH 3 LENGTH = 1800' ✓

CROSS SECTION ✓ : $\frac{1320}{0}, \frac{1322}{700}, \frac{1320}{880}, \frac{1314}{1320}, \frac{1304}{1330}, \frac{1304}{1370}, \frac{1314}{1380}, \frac{1322}{2200}$

SLOPE = (1308 - 1304) ÷ 1800 = 0.0022

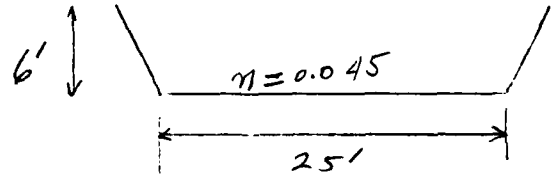
REACH 4 LENGTH = 1500'

CROSS SECTION : $\frac{1315}{0}, \frac{1312}{1200}, \frac{1302}{1255}, \frac{1302}{1295}, \frac{1312}{1320}, \frac{1315}{1900}, \frac{1318}{2900}, \frac{1319}{3000}$

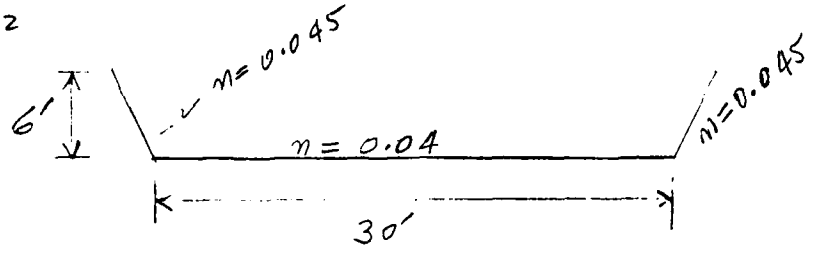
SLOPE = (1304 - 1302) ÷ 1500 = 0.0013

DOWNSTREAM CHANNEL SECTIONS

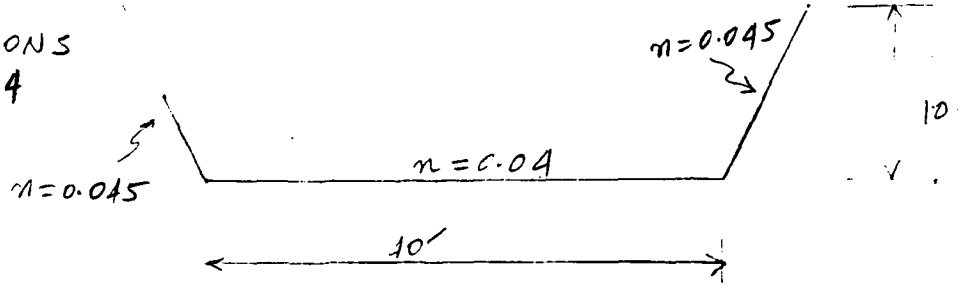
SECTION 1
:
2



SECTION 2



SECTIONS
3 & 4



CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

(DAM NY596)

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	1391.8	74.6	964
2) Design High Water (Max. Design Pool)	1386.6	59.5	612
3) Auxiliary Spillway Crest	1386.6	59.5	612
4) Pool Level with Flashboards	N/A	—	—
5) Service Spillway Crest	1381.0	8.8	41

DISCHARGES

	Volume (cfs)
1) Average Daily	unknown
2) Spillway @ Maximum High Water	492
3) Spillway @ Design High Water	481
4) Spillway @ Auxiliary Spillway Crest Elevation	481
5) Low Level Outlet (gated reservoir drain)	0
6) Total (of all facilities) @ Maximum High Water	8200
7) Maximum Known Flood	unknown
8) At Time of Inspection	31

CREST: ELEVATION: 1391.8

Type: broad-crested ; grassed earth embankment

Width: 16 ft. Length 1590 ft.

Spillover

Location south end of dam

SPILLWAY:

SERVICE		AUXILIARY
1381.0	Elevation	1386.6
Conc. pipe w/ riser	Type	excavated channel
48" dia.	Width	200' Bottom width w/ 1V:3H sideslopes
	Type of Control	
✓	Uncontrolled	✓
	Controlled:	
	Type (Flashboards; gate)	
	Number	
	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
	Chute Length	
	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	

HYDROMETEROLOGICAL GAGES:

Type : None

Location: -

Records:

Date - -

Max. Reading - -

FLOOD WATER CONTROL SYSTEM:

Warning System: None

Method of Controlled Releases (mechanisms):

None

93-15-4(9/80)

4

DRAINAGE AREA: 6.0 sq. mi.

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: Woodland, pastures, farmlands, very minor development

Terrain - Relief: Rolling

Surface - Soil: Glacial till over shallow bedrock

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

None

Potential Sedimentation problem areas (natural or man-made; present or future)

None at present. The dam was designed for a 50 yr. sediment accumulation.

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

flooding of agricultural lands.

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: None

Elevation: -

Reservoir:

Length @ Maximum Pool: ±0.6 (Miles)

Length of Shoreline (@ Spillway Crest) ± 0.4 (Miles)

80)

APPENDIX E

REFERENCES

APPENDIX E

REFERENCES

1) U.S. Department of Commerce, Technical Paper No. 40, Rainfall Frequency Atlas of the United States, May, 1961.

2) F.M. Henderson, Open Channel Flow, Macmillian Publishing Co., Inc., 1966.

3) H.W. King and E.F. Brater, Handbook of Hydraulics, 5th Edition, McGraw-Hill, 1963.

4) T. W. Lambe and R.V. Whitman, Soil Mechanics, John Wiley and Sons, 1969.

5) W.D. Thornbury, Principles of Geomorphology, John Wiley and Sons, 1969.

6) University of the State of New York, Geology of New York, Education Leaflet 20, Reprinted 1973.

7) Cornell University Agriculture Experiment Station (compiled by M.G. Cline and R.L. Marshall), General Soil Map of New York State and Soils of New York Landscapes , Information Bulletin 119, 1977.

8) U.S. Department of Commerce, Hydrometeorological Report No. 33, Seasonal Variation of the Probable Maximum Precipitation East of the 105th Meridian for Areas From 10 to 1000 Square Miles and Durations of 6, 12, 24, and 48 hours, April 1956.

9) U.S. Department of the Army, Engineering Manual 1110-2-1411, Standard Project Flood Determinations, March 1952.

10) U.S. Army Corps of Engineers, The Hydrologic Engineering Center, Flood Hydrograph Package (HEC-1) Users Manual for Dam Safety Investigations, September, 1978.

APPENDIX F

PREVIOUS INSPECTION REPORTS/ AVAILABLE DOCUMENTS

DAM INSPECTION REPORT
(By Visual Inspection)

Dam Number	River Basin	Town	County	Hazard Class	Date & Inspector
NB-3979	Allegany	Villenova	Chautauqua	B+	10/18/77 KW.H.

Stream = Owner = County

Type of Construction

- [ ] Earth w/Concrete Spillway
- [x] Earth w/Drop Inlet Pipe Conc.
- [ ] Earth w/Stone or Riprap Spillway
- [ ] Concrete
- [ ] Stone
- [x] Timber
- [ ] Other _____

Use

- [ ] Water Supply
- [ ] Power
- [ ] Recreation - [ ] High Density
- [ ] Fish and Wildlife
- [ ] Farm Pond
- [ ] No Apparent Use-Abandoned
- [x] Flood Control
- [ ] Other _____

~~Stored~~ Impoundment Size 65 Acres ~~Estimated~~ Height of Dam above Streambed 42 Ft.

Condition of Spillway

- [x] Service satisfactory
- [ ] In need of repair or maintenance
- [x] Auxiliary satisfactory
- [ ] In need of repair or maintenance

Explain: _____

Condition of Non-Overflow Section

- [x] Satisfactory
- [ ] In need of repair or maintenance

Explain: _____

Condition of Mechanical Equipment

- [x] Satisfactory
- [ ] In need of repair or maintenance

Explain: _____

Siltation [ ] High [x] Low

Explain: _____

Remarks: _____

Evaluation (From Visual Inspection)

- [ ] Repairs req'd. beyond normal maint.
- [x] No defects observed beyond normal maint.

MEMORANDUM
DEPARTMENT OF TRANSPORTATION

DATE February 14, 1972

SUBJECT CONEWANGO CREEK WATERSHED PROJECT
FLOODWATER RETARDING DAM, SITE 9A
CHAUTAUQUA COUNTY

FROM Wm. P. Hofmann, Soil Mechanics Bureau, Rm. 102, Bldg. 7 BEB.
By: Bernard E. Butler

TO A. W. Moon, Bridge Planning and Railroads Bur., 6th Flr., Bldg. 5 ✓

This Bureau has completed a review of the soils and foundation aspects of the subject dam. Our review was based on plans and specifications prepared by the U.S.D.A. Soil Conservation Service and received in this office on January 19, 1972.

Our review indicates the design, in general, properly accounts for the anticipated soils and foundation conditions. However, we offer the following comment:

1. On sheet No. 7, Drawing No. NY-2161-P under Earth Fill Requirements Note No. 2, "hand tamping or" should be deleted.

BEB:PJW:MVM

DESIGN REPORT

CONEWANGO CREEK WATERSHED
SITE 9A
FLOODWATER RETARDING DAM
CHAUTAUQUA COUNTY, NEW YORK

US DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE

DESIGN SECTION, SYRACUSE, N.Y.

Sheet 1 of 1

This single purpose flood control structure is located on an unnamed tributary to the West branch of Conewango Creek approximately 4 miles NW of South Dayton in the Town of Villenova. Sheet 5 of this report, together with the Perrysburg 7.5' quadrangle published by the U.S. Geological Survey, may be used to locate this site.

A summary of pertinent design information is given on Sheet 3 of this report.

Criteria and procedures used in this design are given in Soil Conservation Service publications.

This structure is one of 20 proposed floodwater retarding dams in the Conewango Creek Watershed designed to reduce floodwater damage.

Site 9A is designed to retard a 50-yr. frequency storm without discharge occurring in the emergency spillway.

The results of hydrologic and hydraulic computations are given on Sheet 4 of this report.

The structure consists of a zoned, compacted earth fill primarily of gravelly glacial till (GM), and alluvial gravel (GM-GP).

In the floodplain of the foundation, sandy gravel (GM-GP) alluvium overlies lacustrine CL silt and sandy silt deposits. Alluvial gravels and sands underlie the lacustrine materials and glacial till underlies the alluvial materials.

A dense cemented alluvial GM gravel underlies the glacial till of the left abutment and the alluvium and colluvium in the right abutment.

A drainage system is located under the downstream portion of the earth fill to control the phreatic surface and to provide a safe outlet for foundation seepage. A cutoff trench is located on the dam centerline to reduce seepage.

The principal spillway is a drop inlet structure composed of a 2-stage reinforced concrete riser, 48" diameter concrete water pipe, impact basin, and excavated outlet channel.

A vegetated earth emergency spillway with a bottom width of 200' is provided in the left abutment.

U.S. DEPARTMENT OF AGRICULTURE - SOIL CONSERVATION SERVICE

Element of Structure	Determining Factor	Elev.	Surface Area Acres	Storage		Inflow		Peak Outflow C.F.S.
				AC.FT.	Inches *	Volume In. *	Rate C.F.S.	
Invert of Orifice	50 Yr. Submerged Sediment	1366.6	8.8	40.6	0.13	-	-	-
Crest of Riser	1.00" Storage plus 100 Yr. Total Sediment	1381.0	44.0	415.6 1/	1.30	-	-	114
Crest of Emergency Spillway	50 Yr. Frequency Storm, AMC II	1386.6	59.5	611.9 2/	1.91	-	-	312
Design High Water	ES-1020 Sh. 2 of 5. AMC II **	1388.7	65.5	746.2 2/	2.33	3.56	3178	1709
Top of Dam	ES-1020 Sh. 3 of 5. AMC II **	1391.8	74.5	964.2 2/	3.01	8.80	7938	6941

1/ Includes 14.7 Ac. Ft. of Acr. Sediment Storage.
2/ Excludes 95.8 Ac. Ft. total sediment storage.

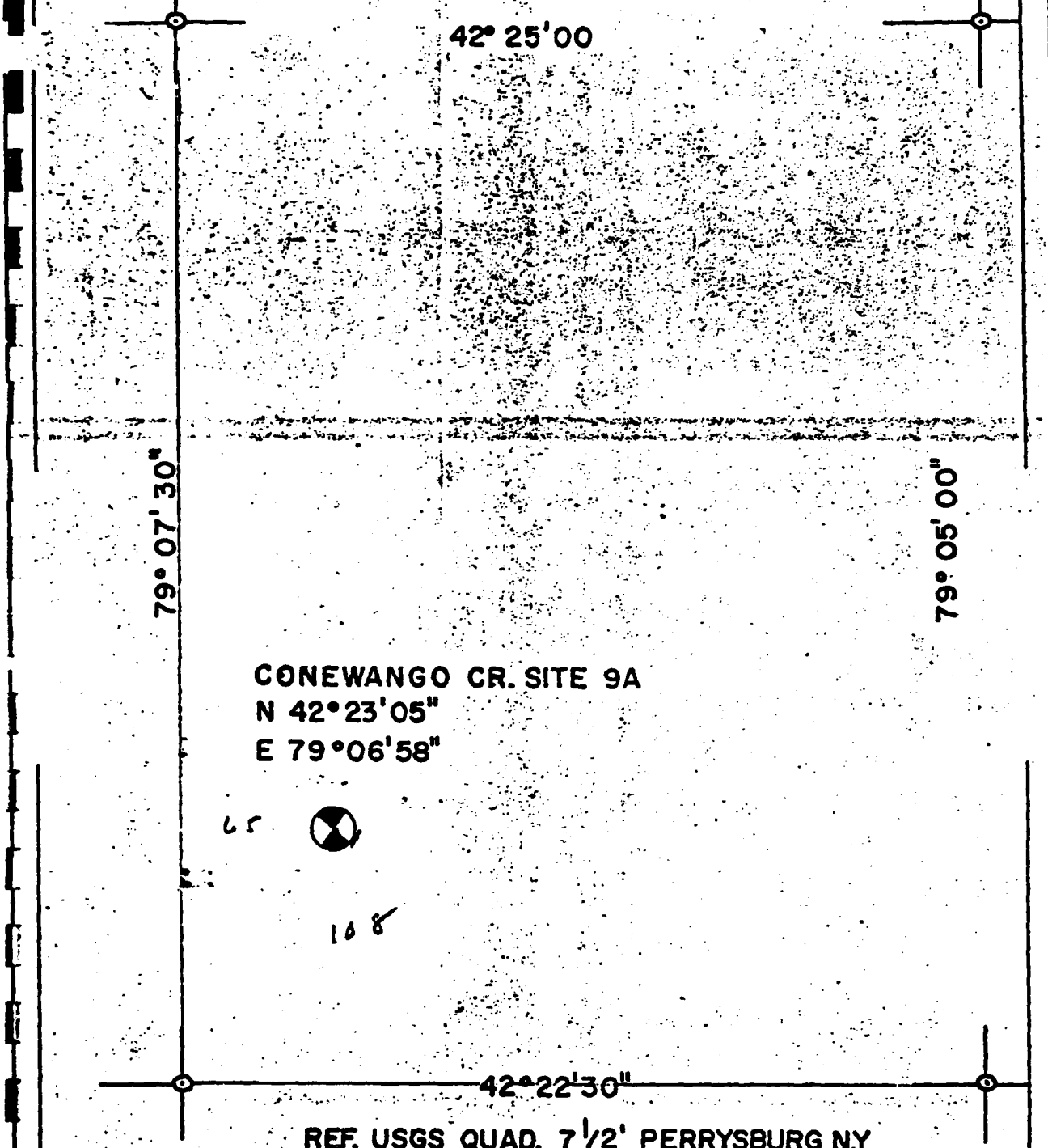
* Volume expressed in inches of runoff from controlled watershed of 3840 acres.
** Refer to hydrologic criteria in National Engineering Memo SCS-27 (Rev.).

DESIGN SECTION, SYRACUSE, N.Y.

F-6

Sheet 4 of 6

U. S. DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE



REF. USGS QUAD. 7 1/2' PERRYSBURG N.Y

DESIGN SECTION, SYRACUSE, N.Y.

Sheet 5 of 6

U. S. DEPARTMENT OF AGRICULTURE — SOIL CONSERVATION SERVICE

Information pertaining to the criteria and procedures referred to in this report may be obtained from Mr. Albert C. Addison, State Conservationist, U. S. Department of Agriculture, Soil Conservation Service, Syracuse, New York.

Design Engineer

for State Conservation Engineer

DESIGN SECTION, SYRACUSE, N Y

Sheet of

March 1, 1972

Mr. Eldred Rich, Chief
Bureau of Water Management
Department of Environmental Conservation
Division of Resource Management Services
50 Wolf Road
Albany, New York 12205

Dear Sir:

Dam at Site 9A
Conewango Creek Watershed Project

The plans, specifications and other data submitted by the Bureau of Water Management, to the Structures Subdivision of the Department of Transportation for the construction by the owner, Conewango Creek Watershed Commission, Court House, Mayville, New York, of a flood water retarding dam located in the Town of Villenova, County of Chautauqua and situated on an unknown tributary of Conewango Creek, have been reviewed.

The design and details pertaining to the soils, foundation and structural features of the dam are satisfactory to us insofar as the safety and stability of the structure are concerned.

The structure has been listed upon our records under the designation of Dam No. 7B-3979 of the Allegheny River Watershed.

Two sets of formally approved plans and specifications are enclosed. Also enclosed are two copies of the Bureau of Soil Mechanics' memorandum to this office stating the Bureau's comments concerning the anticipated soils and foundation conditions at the dam site with a recommendation to be followed during the construction of the structure. The recommendation is shown marked in red on the plans.

Very truly yours,

[illegible] signed by
A. W. MOON

A. W. MOON
Assistant Deputy Chief Engineer

AWM:HCS:MR
Attachments
cc: Wm. F. Hofmann

New York State Department of Environmental Conservation

MEMORANDUM

TB 3979
NY 596

TO: Eldred Rich

FROM: Charles W. Kolak

SUBJECT: Conewango Creek Site 9-A Watershed Project, March 17, 1972

DATE: May 10, 1972

~~In response to the request by the Stream Protection Section of the Bureau of Water Regulation,~~ We have made a hydrologic and hydraulic investigation of the proposed watershed project at Conewango Creek - Site 9A, Hamlet, New York.

The following information was used to evaluate the proposed dam:

1. Application for permit submitted by SCS, Syracuse, New York

2. Contract drawings and specifications submitted by SCS

The design of the auxiliary spillway and the service spillway were reviewed and the following results were obtained:

AUXILIARY SPILLWAY

Hydrology:

Downstream hazard classification is Class "B".

Drainage Area -- 6.00 square miles
Design Flood -- Emergency Spillway Hydrograph for Class "B" Structures (ES 1020 sheet 2 of 5)
Reference -- "Guidelines for Small Earth Dam Designs" - New York State
Rainfall = 6.2"
CN=77
Runoff 3.7"
Reference -- SCS National Engineering Handbook, Section 4 - Hydrology Chapter 21

Flood Routing:

The design hydrograph indicates a maximum inflow of 2890 cfs. At 3.00 hours, water will begin spilling over the crest of the auxiliary spillway. The peak discharge occurs at t=5.04 hours with 2335 cfs discharging over the auxiliary spillway and 340 cfs discharging through the service spillway. The reservoir water surface reached an elevation of 1388.95 which will provide more than the required 2 feet of freeboard.

SERVICE SPILLWAY

Hydrology:

Downstream hazard classification is Class "B".

Drainage Area -- 6.00 square miles
Design Flood -- New York State requirement 25-year, 6-hour storm
Reference -- "Guidelines for Small Earth Dam Designs" - New York State and Technical Paper #40, Pg. 42
Rainfall = 3.5"
CN=77
Runoff -- 1.45"
Maximum Q = 1290 cfs
Reference -- SCS National Engineering Handbook, Section 4 - Hydrology Chapter 21

Flood Routing:

The reservoir will have sufficient capacity to store all the runoff from the design flood without discharging in the auxiliary spillway. It was therefore not necessary to go through the flood routing calculations.

CONCLUSION

Auxiliary Spillway:

The auxiliary spillway has sufficient capacity to discharge the design storm and also have ~~1 foot~~ 2 feet of freeboard below the top of the dam.

Service Spillway:

The service spillway has sufficient capacity to retard the design storm without discharge occurring in the auxiliary spillway.

Drawdown:

The reservoir drain inlet is sufficient to drain the reservoir within the drawdown times.

General Comments:

1. A copy of the hydrologic and hydraulic comments that were sent to ~~the Bureau of Water Regulation~~ Frank Dwyer of Water Management are attached.
2. Soil stability analysis and structural comments will be furnished by the Department of Transportation.

CWK:GK/ea

New York State Department of Environmental Conservation

MEMORANDUM

TO: Eldred Rich

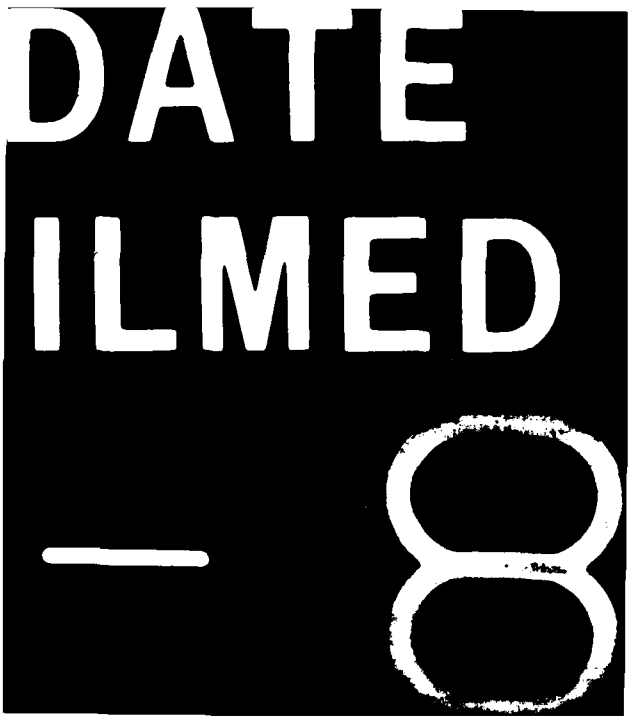
FROM: Charles W. Kolak CWK

SUBJECT: Review of Conewango Creek Watershed Project - Site 9A

DATE: March 8, 1972

The hydraulics and hydrology were reviewed for the proposed dam and were found to be satisfactory.

CWK/ea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